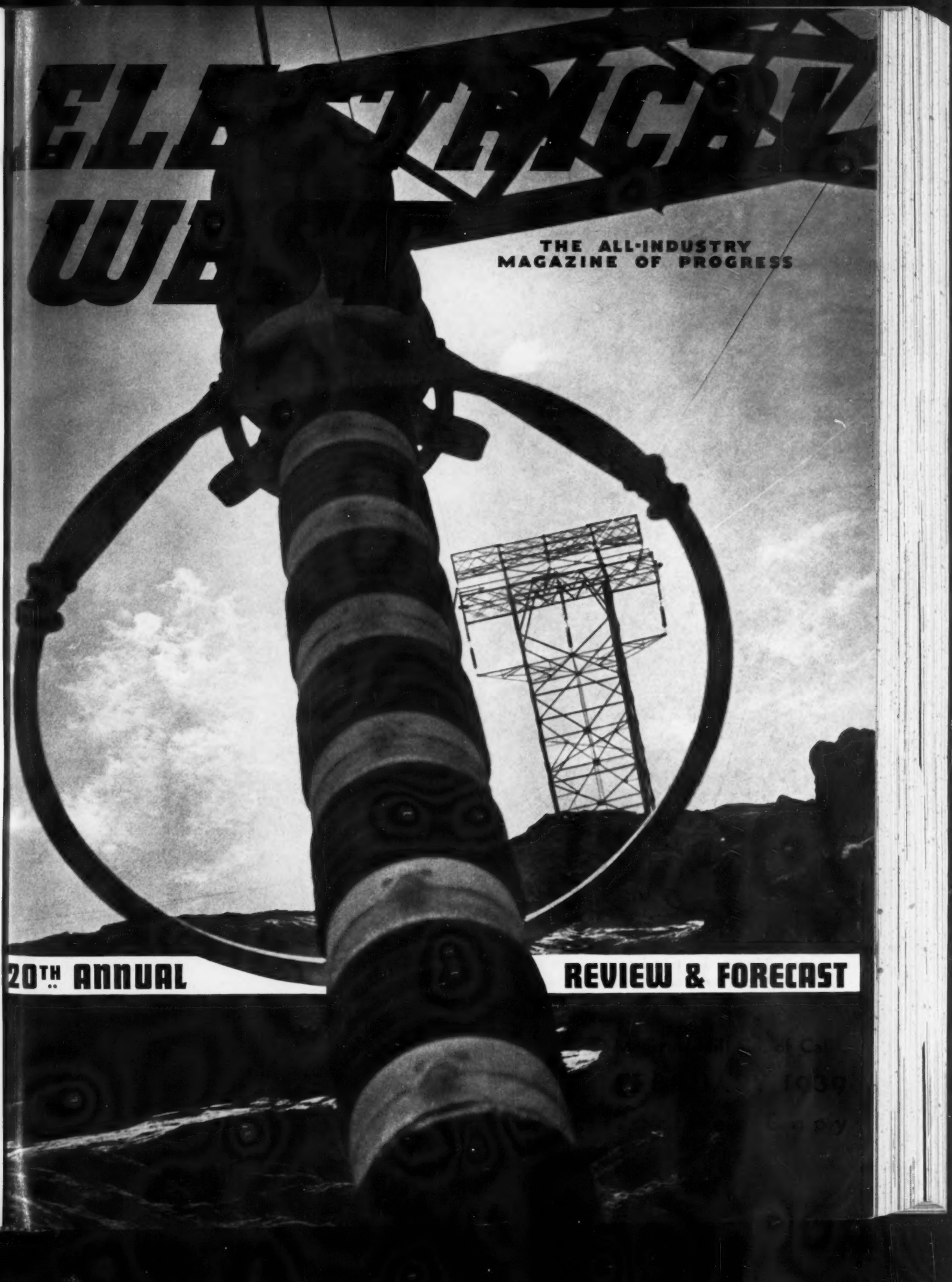
ELECTRICAL
WE
THE ALL-INDUSTRY
MAGAZINE OF PROGRESS
20TH ANNUAL
REVIEW & FORECAST

Edison Advertising

SELLS LIGHTING AND WIRING TOO

Beauty IS NOT LOST AT NIGHT WITH PROPER PICTURE LIGHTING
THE MODERN HOME IS ADEQUATELY WIRED
Now Available
NEW RED SEAL WIRING BOOKLET
BUILD Electrical CONVENIENCE INTO YOUR HOMES
Spare the Light
AND YOU MAY SPOIL THE SIGHT
WILL THEY BE "EYE-CRIPPLES"?
SOUTHERN CALIFORNIA EDISON COMPANY LTD.
MORE CONVENIENCE IN YOUR KITCHEN WITH RED SEAL WIRING
Electricity
THE SCENES

Year after year Edison advertising continues to preach the gospel of better lighting. Today the average home contains several good reading and study lamps where one would have been a curiosity a few years ago.

In this way, the market for lighting units is constantly being widened and selling made easier. But the effect of Edison advertising goes beyond that point. Better lighting in the home means better wiring, too,—more outlets,—more circuits,—better facilities to carry the increased load. Thus Edison advertising has a three-way benefit—to the dealer, to the contractor and to the utility itself. Truly unselfish in concept, it is designed as a helpful activity for the industry as a whole.

2-39

SOUTHERN CALIFORNIA EDISON COMPANY LTD.

ELECTRICAL WEST (with which is consolidated The Journal of Electricity), February, 1939, Vol. 82, No. 2. Published monthly by the McGraw-Hill Company of California, 883 Mission St., San Francisco, Calif. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. Additional entry as second class matter at the post office at Los Angeles. Printed in U. S. A. Subscription rate in U. S. and U. S. possessions, and Canada, $2 per year; all other countries $3 gold (thirteen shillings). Single copy 25c.
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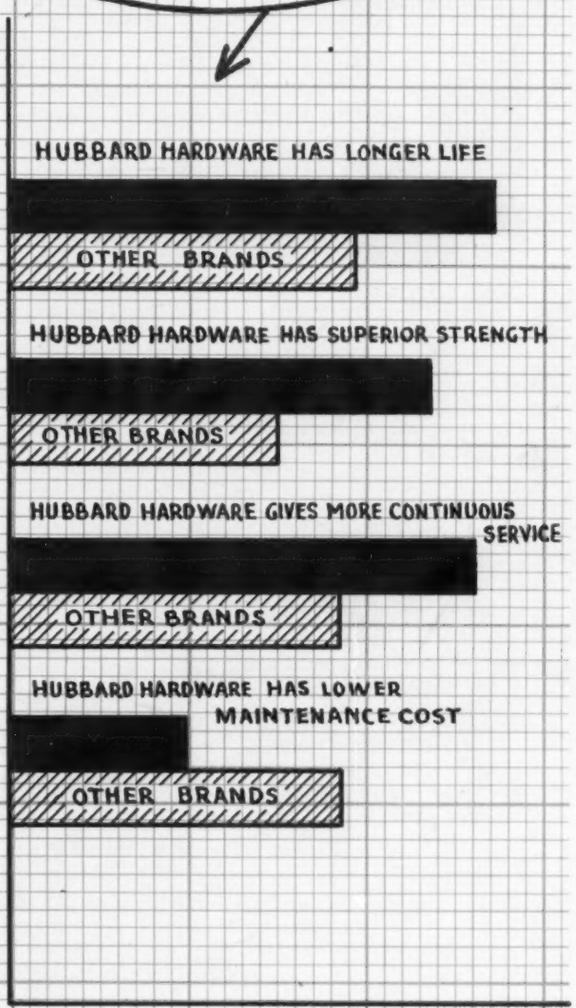
Memo to:
Mr. Engineer
Mr. Executive

Statistics you should consider in the planning of your 1939 purchases of POLE LINE HARDWARE



THESE FACTS ASSURE YOU THAT IT Pays TO USE HUBBARD POLE LINE HARDWARE

1. HISTORY AND BACKGROUND—Hubbard and Company have been working with steel products for 95 years. Hubbard and Company have been making pole line hardware for over 50 years. This experience in working with steel has enabled us to make many contributions to the art and science of the industry. Among these was the early realization of the importance of a protective coating for pole line hardware, and Hubbard's double-dip non-porous galvanizing has established a standard for the industry.

2. ORGANIZATION—Workmen and artisans of Hubbard for over 50 years have contributed a quality of workmanship that only a master craftsman can create.

3. ENGINEERING—All Hubbard products are well designed and engineered by a competent staff. Every item must meet rigid tests in our own laboratory.

4. MANUFACTURING FACILITIES—Hubbard and Company today are the largest manufacturers of pole line hardware and construction specialties. Complete and self-sustained pole line hardware factories are located at Emeryville, Calif. —Pittsburgh and Chicago.

5. POLICY—Since the inception of its business, to provide immediate service at convenient points, a 100% distributor policy has been established. On the Pacific Coast alone 22 branches of General Electric Supply Corp. and Graybar Electric Company carry complete and adequate stocks sufficient to meet any emergency or maintenance need—yes, even a large construction project.

For Final Proof—Ask Your Lineman

Hubbard and COMPANY

OAKLAND, CAL. PITTSBURGH CHICAGO

THE HARDWARE MAKES THE LINE...HUBBARD MAKES THE HARDWARE

BETWEEN THIS MONTH'S COVERS

The Future?

What's Ahead in Electrical Farming (p. 31): "Twenty years ago we might justify considerable pessimism about the practical applications of electricity to agriculture. Today it is somewhat different. New uses and applications will be found through more research." So says H. B. Walker, professor of agricultural engineering at the University of California and chairman of the California Committee on the Relation of Electricity to Agriculture.

Encouragement Needed

Industry Looks Westward (p. 33) by George W. Malone: The West's opportunity lies in the recent realignment of industry. It is therefore wise to encourage the development of our natural resources. If these are properly exploited, prospects for new power-using industries in the West are tremendous. Malone, who is a former Nevada state engineer and is now manager of Industrial West, Inc., bases these assertions on an exhaustive survey made by Industrial West. This is to be published in two volumes this month (cost: $20). It covers all phases of the industrial resources and markets of the West.

Appliance Market

How Many Appliances Can We Sell? (p. 35): In view of the high saturations of some appliances in the West, chances of reaching the remaining and replacement markets might seem dim. But they're not. At least three power companies who report unusually high saturation figures for 1938 were among the leaders in selling appliances. And the NEMA estimates that there is still a market for millions of appliances. Which makes 1939 prospects bright.

Up, Up, Up

New Boom in Building (p. 36): Not since 1924 has the construction industry been so active. Last year total building permits in 100 Western cities were in excess of $275,000,000. This was the highest figure since 1932. All Western authorities maintain that this steady improvement will continue through 1939.

Statistics

Here Is Your Livelihood (p. 38): Electric business in the West displays a healthy growth which renders it largely immune to national ups and downs. Last year national electric use fell off 7%, but electric use in the West fell off only 3%. The year saw considerable adding of generating capacity. West shows a 7% increase, while national average was only 4%. Per capita use is almost double the national average. The eleven Western states report 1,581 kw.-hr. per individual against 864 for the U. S. as a whole.

H. B. WALKER

G. W. MALONE

Year of Action

Budget for 1939 (p. 40): More additions to physical plant will be made by Western systems this year than for many years past. Total expenditure in this line by 31 principal systems will be more than $80,000,000. The Rural Electrification Administration allotted more than four and a half million to the West last year, and the unfinished business of other federal projects runs into hundreds of millions. The 80 million figure for the private and municipal systems is 35% more than their actual outlay last year. In general, the government is putting in hydro plants while the systems are undertaking steam additions for reliable service. Distribution improvements bulk large.

New Products	6
New Books	22
Product Data	24
Letters	24
Electra's Husband	28
All-Industry	31
Engineering	40
Sales Parade	53
Sales Guide	65
Editorial	70
Lighting & Wiring	72
News of the Industry	82

Cover: Taken by Nevada-California Electric through a lightning arrester atop the Boulder Dam power house, showing one of the company's towers

Merchandising

Sales, Past and Future (p. 53) by Clotilde Grunsky, Pacific Coast editor of *Electrical Merchandising*: No utility is inclined to boast about its 1938 sales. There were only a few ups. Collectively speaking, however, the picture was not too black. Appliance sales in the West totalled over $100,000,000. The number of domestic, rural and commercial customers showed an increase over 1937. New records were hung up in the field of kw.-hr. consumption. What will happen this year cannot be predicted. Consensus is that things will be better.

In Defense

Come Out, Come Out Wherever You Are (p. 72): This is an answer to a recent article, "Consumers Aren't Suckers." It comes from Herbert Metz, sales promotion manager of Graybar and chairman of the Adequate Wiring Bureau's plan committee. Says Metz: No ad can be called bad until it has proved that it does not draw inquiry. Furthermore, Adequate Wiring Bureau ads are the acme of simplicity—they can be understood by almost anyone.

Practical Teaching

Electrolysis for the Maintenance Man (p. 76) by R. D. Coon: Many electrochemical processes now used by industrial plants depend on electrolysis. It is therefore the job of every maintenance engineer to learn something about this chemical decomposition by the action of electric current. So says Coon, who is superintendent of the electrical department of Procter & Gamble, Long Beach. Last year he was chairman of the editorial committee of the Southern California Maintenance Engineers' Assn.

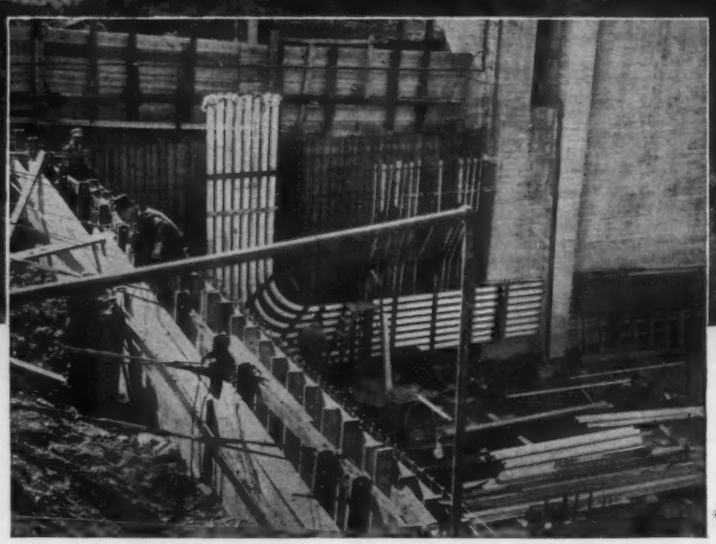
Coming Up

Next Month: Best news of the year to date is that ELECTRICAL WEST will publish a pictorial guide to the electrical attractions of the San Francisco Fair. If you haven't already seen the splendor of Treasure Island at night, you'll want to see it this summer. ELECTRICAL WEST's insert will be your most authoritative guide.

The Finest Wire Ever Made
SAFECOTE
FISHABLE — SLICK FINISH
MARKED — MEASURED
SHERARDUCT
INSPECTED CONDUIT
XP-40
National SAF
SAFECOTE R 600V 3/0
NATIONAL
ELECTRIC PRODUCTS
NE
WIRING SYSTEMS
6
WIRES AND CABLES
National Electric
PRODUCTS CORPORATION
Pittsburgh, Pa.

Distribution AND

J-M TRANSITE CONDUIT—Because of its enduring strength, even against sustained stresses, this asbestos-cement cableway needs no concrete casing underground or on exposed locations . . . effects important installation savings. It does not rot or burn and is practically impervious to corrosion and decay under all soil and weather conditions. Its exceptional durability provides lasting freedom from high upkeep charges.



J-M TRANSITE KORDUCT—Where "concreting-in" is necessary, this thinner walled companion of Transite Conduit is ideal. Its unusually light weight and long lengths make sizable reductions in handling and installation costs. Transite Korduct is incombustible, does not slag under arc, will not adhere to cables and has an exceptionally high rate of heat dissipation. Provides the same virtually maintenance-free service as Transite Conduit.

JOHNS-MANVILLE JM PRODUCTS

Johns-Manville ELECTRICAL

Costs Hit Bottom— STAY THERE!

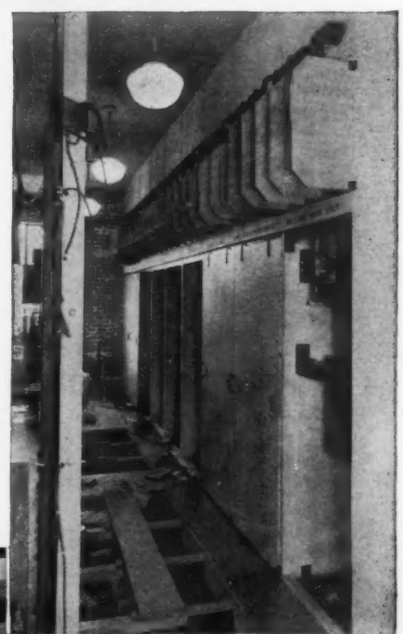
Wherever these J-M Materials are used

BACK of each of the five J-M Electrical Products shown on these pages is one idea:

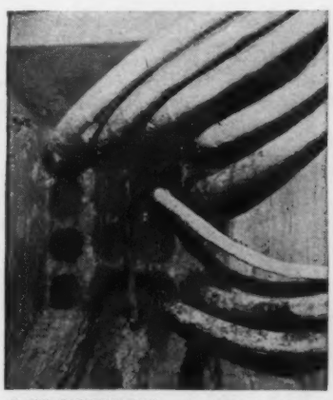
To keep your distribution costs at permanently low figures.

And, on hundreds of installations all over the country, these J-M Electrical Products are proving their ability to do exactly that. Easy and simple to apply, they make substantial reductions in original expense. Their imperishable asbestos base provides complete protection against fire and corrosion damage . . . eliminates maintenance as a major item. They last longer, provide greater safety—and the operating savings that follow considerably lower the cost of any distribution system.

Check the advantages of J-M Electrical Products against your requirements. You'll see new ways to improve service and save money. For complete information, write Johns-Manville, 22 East 40th Street, New York City, New York.



J-M TRANCELL—This tough, durable cell structure material is unequaled for compartment doors, barriers, partitions, etc., and is ideal for housing electrical equipment. Made of asbestos fiber with an inorganic binder, it is light in weight, yet unusually strong. J-M Trancell is furnished with or without asbestos-cement facing sheets, is easily worked with ordinary tools. Entirely mineral in composition, it is completely incombustible . . . provides an excellent fire barrier.

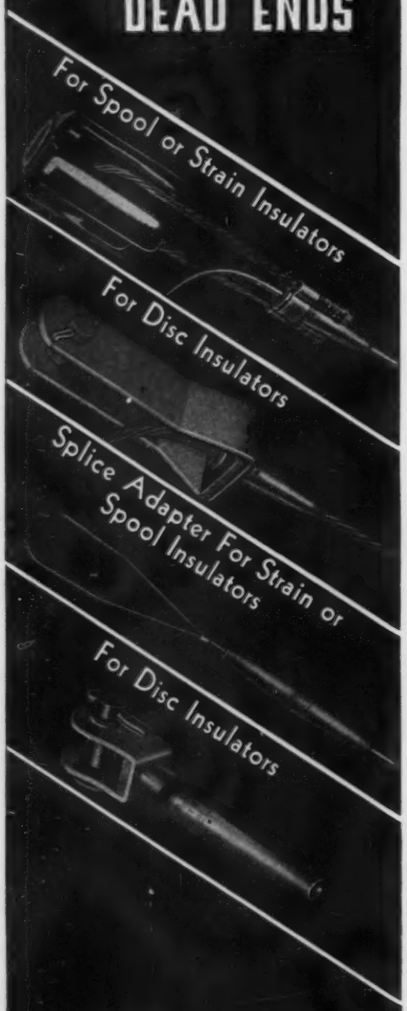


J-M DUXSEAL—A plastic, nonhardening putty for sealing duct openings *tightly*. Unaffected by temperature changes, by liquids or gases ordinarily found in underground cableway structures.

J-M NIAGRITE-ASBESTOMENT—This exceptionally efficient cable fireproofing is easy to apply, provides definite economies in service. Shields cables from excessive heat. And, while it will not save the cable itself when arcing occurs, Niagrite-Asbestoment assures maximum protection against damage to adjacent cables and equipment.

PRODUCTS *For Every Type of Distribution System*

Reliable
STRAIGHTLINE DEAD ENDS



Flexible clevis Straight-Thru type FD—A compact and convenient low cost unit.

Long rigid clevis Straight-Thru type LD Sturdy and easily handled.

Straightline Splice adapter type DD—For economy in stocking.

Rigid clevis type D Compact and economical.

Reliable Straightline Dead Ends include design features of the Straightline Splice. Straight-Thru type permits easy take-up of slack.

Reliable ELECTRIC COMPANY
OVER 25 YEARS SERVICE TO THE UTILITIES
3145 CARROLL AVENUE • CHICAGO ILLINOIS

NEW PRODUCTS

Editor's Note: *The new 1939 appliances have made their appearance. The following New Product items are condensations of reams of promotional announcements.*

Gale Refrigerators

A sealed evaporator is the outstanding feature of the Gale (formerly Briggs) refrigerators introduced by Gale Products, the new division of Outboard, Marine & Mfg. Co. With this device, the ice-cube compartment, sealed by a glass door, is protected from food odors, air and moisture. This is said to result in a marked absence of frost accumulation between ice trays and freezer shelves and an absence of taste in the ice cubes. The compartment is internally lighted and uses the freezer-shelf principle for fast freezing. The evaporator is incorporated in all deluxe models. Both standard and deluxe models boast 20% more interior food storage space because of improved design.

G-E Refrigerators

New styling and a cold storage compartment providing lower temperature and higher humidity for meat storage are the principal talking points of General Electric's refrigerators. The changed styling is most noticeable in the fluted door and stainless steel base grille. The cold-storage compartment is located directly under the super-freezer. Interior temperature is from 5 to 10 deg. colder than that of the cabinet proper. The entire compartment slides, but not far enough to drop. All shelves of the refrigerators have bar fronts, and plastic shelf supports have been streamlined. The cabinet light has been given a center location. A "Tel-A-Frost" indicator tells the proper time to defrost. All the refrigerators are powered by hermetically sealed units with Scotch-yoke compressors. Power is introduced through indestructible metal glass leads. A single knob controls the entire operation of the refrigerators.

Hotpoint Refrigerators

Five standard models, three deluxe, four imperial and one 6-cu.ft. special comprise Hotpoint's refrigerator line. All units are designed, like other Hotpoint appliances, to harmonize with equipment in an all-electric kitchen. All fit within 1¼ in. of the wall and do not protrude beyond adjoining cabinets. Features have been added to the five zones of cold. In the "speed freezing" zone, the

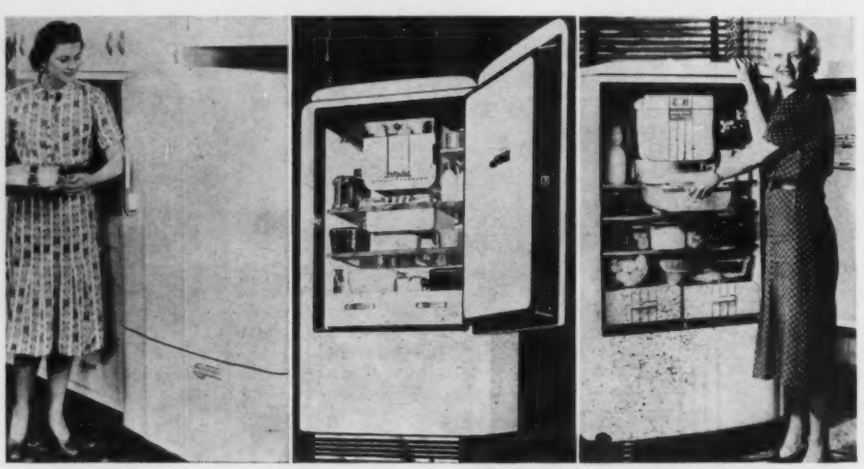
Kelvinator refrigerator. Glass covers of vegetable compartments are independently suspended

1939 stainless-steel speed freezer itself is finished in baked Calgloss (also used as the refrigerators' exterior finish), with rounded corners for easy cleaning. In most models a new 2-qt. dessert tray has been added. Some models have removable shelves in the speed freezer to make room for a carton of ice cream. A cold storage compartment is located directly beneath the speed freezer. This may be arranged in six different ways. Automatic motor protection is another talking point: in case of a line surge the motor will stop, then automatically resume operation when current returns to normal.

Kelvinator Refrigerators

Celebrating the silver anniversary of the electric refrigerator, Kelvinator this year introduces a line of "25th Anniversary Models." Twelve models are being marketed. Average retail price will be lower than in 1938. A special low-price model measures 6¼ cu.ft. Highpoint of the presentation is the "Polar-sphere" mechanical unit. Last year this was introduced as a sealed unit. This year the fan assembly has been removed so that there is no air noise and nothing to oil. A larger, more efficient condenser and a larger air duct to get "chimney draft" natural convection are used. Injector-type refrigerant distribution is employed in the high-speed freezer. Cabinets are wider and not so deep. Like most other refrigerators, there is no set-back between door opening and sides. Other features include an additional fast-freezing shelf, sliding and adjustable shelves, twin dome lights to illuminate the interior, cold chest and meat-keeping compartment and a control which

(Continued on page 9)



Refrigerators: (left to right) Westinghouse, Hotpoint, G-E

S & C Resistors shown on Fused Disconnect, are entirely enclosed yet visible. S & C Resistors reduce magnetic stresses and are made for voltages to 34,500 volts, indoor—and, to 138,000 volts, outdoor.

REG. U.S. PAT. OFF.

DEPENDABLE PROTECTION

• S & C Protective Fuses and Cutouts embrace the widest range of ampere and voltage ratings—and the widest range of interrupting capacities . . . The same accuracy and care used in the design and construction of S & C Fuses for the largest power transformer banks—you will find in S & C Fuse Links and Cutouts. For dependable system protection, you can always rely on S & C—and can obtain a fuse for practically every need.

Where extremely high value short circuit conditions may be encountered, the S & C Type "SM" Fuse is available in 200 and 400 ampere ratings for use on system voltages from 5,000 to 34,500 volts.

For distribution lines, feeder and customer substation protection, S & C Semafor Reclosing Fuses have established records for accuracy and reliability. They automatically restore service, — save trouble and expense. (One fuse shown in blown position.)

The strongest and most accurate cutout fuse link—saves many unnecessary service calls. Fits all S & C Cutouts and cutouts of other makes.

S & C Liquid Fuses—the standard of protection. The 73 to 138 KV Corrugated Fuse has 30% more insulation and 20% higher interrupting capacity ... Type C Heavy Duty Fuse with condensing chamber is for indoor service. Type D is applicable for voltages up to 138,000; Light Duty Type B (1 to 25 amps.) is for use up to 69,000 volts.

Saving dollars for many users of S & C Semafor Cutouts has led to their greatly increased application. Typically S & C in design and precise mechanical construction.

The new S & C Enclosed Semafor Cutouts provide the utmost in protection and dependability in this type of distribution service cutout.

SCHWEITZER & CONRAD, Inc.

4435 Ravenswood Avenue, Chicago, Ill. • Manufactured in Canada by Powerlite Devices, Ltd., Toronto

EXPERIENCE WILL CHOOSE THE S & C FUSE

DANGER

RUST AT WORK

RUST is working *everywhere*. RUST is working *all the time*. RUST never sleeps. Its destructive work goes on relentlessly on rustable guy strands. But there is a simple economical answer to your rusting problem — use non-rusting Copperweld strand for all your guys.

Copperweld guy strand is protected from rust by a thick layer of pure copper inseparably molten welded to a tough steel core. Copperweld guy strand is doubly guaranteed; first, a guarantee of copper thickness on every wire; second, a guarantee that the finished strand will have the rust resisting life of solid copper.

A new eight page data booklet recently published contains information on physical properties of Copperweld strand, also installation suggestions and a convenient graphical method of determining the required strength of guys. If you haven't received a copy, write for Engineering Data Booklet E. D. 1686.

COPPERWELD STEEL CO., GLASSPORT, PA.

Pacific Coast Representative: C. E. Ingalls, Rialto Building, San Francisco, California

COPPERWELD

non-rusting

SAFETY

GUY STRAND

automatically returns from the defrosting setting. Even the smallest model will produce 40 large ice cubes; 8-cu.ft. models produce 108 cubes.

Leonard Refrigerators

Center of interest of Leonard's new nine-model line is its low-priced, 6-cu. ft. model to be known as the Challenger Six. It will sell at the lowest price ever placed on a Leonard refrigerator of this size. All 1939 models have

Leonard refrigerator's rearranging shelf

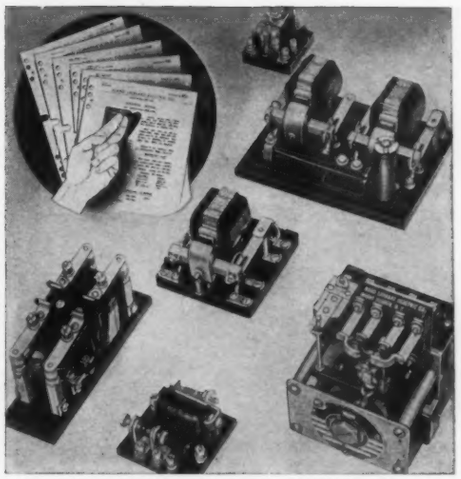
been completely redesigned. Except for minor refinements, the condensing unit is unchanged from 1938. New "injector-type" of refrigerant distribution is incorporated in the evaporator. Top freezing sleeve is refrigerated by direct contact with the tubing carrying the refrigerant, insuring fast freezing in all sleeves. The evaporator's new design permits below-freezing storage of packaged ice cream. In most models, all ice trays are of an improved "ice-popper" type. A two-way, lever action tray release is also featured in most models. Other prominent points include a handy folding rearranging shelf on the door; an unusually large vegetable bin in which nearly 2 bu. of potatoes can be stored; shelf supports are fitted with metal stop clicks to prevent shelves from being slid too far forward or backward; the door handle has a three-way trip, enabling the user to open the door when both hands are full.

Westinghouse Refrigerators

Typical of the improvements in Westinghouse's new line of 14 refrigerators is the "True-Temp" control which maintains temperatures in the food compartment within plus or minus one degree of a 40-deg. normal temperature. Heart of the control is a drop of methyl chloride gas contained in a 5-in. metal tube. Placed outside the froster or evaporator of the food compartment and about 1½ in. from the froster, the gas contracts with cold and expands with heat, automatically expanding or contracting a metal bellows which in turn starts or stops the compressor motor. After it has been set at any point between 34 and 50 deg. F., the control will maintain a constant temperature. In addition, it will give extra-fast freezing at as low as minus 20 deg. Faster freezing is possible in the refrigerators because the flow of the refrigerant into the froster begins immediately when the compressor motor resumes operation. The "Built-in Watchman," a bi-metal Spencer disk, insures complete and automatic protection against overload on the compressor motor. Operating sounds are suppressed by a combination of insulation, a hermetically sealed com-

(Continued on page 12)

Send for this



RELAY DATA

describing midget, intermediate, and heavy duty, sensitive type, time delay and motor driven relays in all contact combinations.

WARD LEONARD ELECTRIC COMPANY

48 SOUTH STREET, MOUNT VERNON, N.Y.

Electric Controls Since 1892

★ *For Quick Service on Quality Products from Local Stocks*

Get in Touch with: **GEO. E. HONN CO.**

420 MARKET ST. SAN FRANCISCO, CAL.

MANUFACTURER'S REPRESENTATIVE FOR:

PYREX INSULATORS
BREWER-TITCHENER HARDWARE
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POWER & DISTRIBUTION TRANSFORMERS
Gardner Electric Mfg. Co.
NIAGARA AIR-INSULATED CURRENT TRANSFORMERS
Niagara Electric Improvement Corp.
CABLE GRIPS
Kellems Products, Inc.
CONNECTORS, GROUND ROD CLAMPS, UTILITY HOISTS
Jasper Blackburn Products Corp.
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Osmose Wood Preserving Co.
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CROMPTON TONG TEST AMMETER
LOW VOLTAGE GENERATORS
Columbia Electric Mfg. Co.
UNDERGROUND TOOLS & EQUIPMENT
T. J. Cope, Incorporated
TREE TRIMMING EQUIPMENT
Bartlett Manufacturing Co.
FRICTION AND RUBBER TAPES
Clifton Manufacturing Co.
BURNHAM SAFETY LINE TOOLS
Burnham Line Tool Co.

ELECTRICAL TESTING LABORATORIES

Electrical Photometrical, Chemical and Mechanical Tests. Inspection of Materials and Apparatus at Manufactory.

80th St. and East End Ave., New York

KEEP AN EYE PEELED FOR

APRIL

and Electrical West's *Manufacturers' Directory*

A valuable source of buying information listing all electrical manufacturers, their Western branch offices and representatives.

G.C.A.
Lamp Replacers
Lamp Base Removers
Cartridge Fuse Tongs
Switch Hooks

Send for Catalogue
We have been making safety tools for 24 years

THE G. C. A. Manufacturing Co.
Pittsfield, Mass.

CHANGING YOUR ADDRESS?
Then be sure to write Circulation Dept., Electrical West, 883 Mission St., San Francisco.

PRINT IN BINDING

Every house needs
Westinghouse

Take it from one who knows.

IT'S A CINCH TO SELL
Westinghouse Water Heaters

LOW SERVICE COST . . . HIGH NET PROFIT . . . DEALER-PROVED!

1,000,000 electric water heater owners are proof that public acceptance is here. Today more than 13,000,000 families can enjoy this modern service economically. YOUR locality is full of prospects.

Westinghouse Water Heaters are easy to sell. Low operating cost, convenience of 24-hour service, cleanliness, modern safety—all are Home-proved! Your initial investment is small. You *keep* your profits; service costs average only 73c per unit — Dealer-proved!

Boost sales — round out your appliance business with the complete line of Westinghouse Water Heaters. Phone your Distributor for facts, promotional helps. Or, write Dept. 9031, Westinghouse Electric & Manufacturing Co., Mansfield, Ohio.

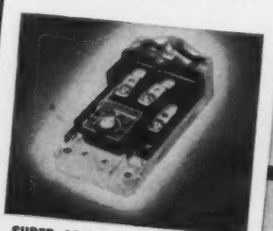
IMPORTANT: Westinghouse Water Heaters are manufactured complete at Mansfield, O., and Emeryville, Calif., for fast delivery to dealers everywhere.

Home-proved PACEMAKING FEATURES MAKE SELLING EASIER

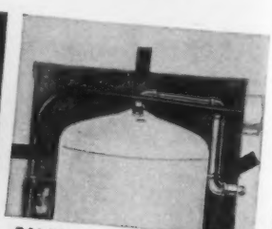
Every advantage, every selling feature of Westinghouse Water Heaters is backed by certified proof from homes like those in which your prospects live. Nothing can beat Home-proof — *it's proof that closes sales!*

SCIENTIFIC BAFFLE . . . Provides more HOT water at a uniformly hot temperature.

COROX UNITS . . . Put all the heat directly into the water. None is wasted.



SUPER ACCURATE THERMOSTATS . . . Keep the water at the right temperature always. End work and worry.



PALCO WOOL INSULATION . . . Keeps the heat in the water. Completely surrounds the water tank.

NEW! ECONOMATIC CONTROL

For territories where external control of the water heater thermostat is recommended. May be easily adjusted by the user to maintain any desired water temperature between 120° and 170°. A Home-proved economy and convenience feature that makes selling easy!

Westinghouse *Home-proved* Water Heaters

"The Line of Least Resistance"

Every house needs

Westinghouse

YOURS *for greater profit*

THE DICTATOR . . . volume sales leader for 1939

The PACEMAKER LINE for '39

8 BEAUTIFUL NEW MODELS . . . STAR SELLING ADVANTAGES ON ALL!

Take in greater profits — sell the Pacemaker Line for '39! More beautiful than ever, the new Westinghouse Kitchen-proved Ranges are studded with every star feature ever dreamed of — the *right* features on the *right* ranges so that selling up is easy. Basic Kitchen-proved cooking features women like so well have been retained — *but now Westinghouse Ranges cook even better, cook still faster, and save more money!* And, prices on popular models are lower than ever!

The improved solid-top of the Corox unit is Columbium Alloy which tests show increases life expectancy 25%. 4000 watts step up the speed of the SuperOven. Biscuits now bake in 8 minutes from a cold-oven start! *Brand new automatic time control* for the Deep Well Economy Cooker on Regent and Dictator ranges eliminates watching.

Platform lights and Cooker on all except the apartment house range . . . Surface Unit Signalite on Emperor and Regent . . . Built-in Minute Minder on the Dictator . . . revolutionary new Menu Master Broiler Pan for Emperor, Regent, and Dictator . . . these are but a few of the star features. So —

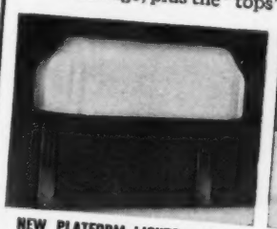
See the PACEMAKER Line Before you Sign for '39

See also the big advertising and promotional program that simplifies selling. Phone or wire your Distributor or get in touch with Dept. 9025, Westinghouse Electric & Manufacturing Company, Mansfield, Ohio.

Kitchen-proved

STAR FEATURES WOMEN WANT

Women demand modern time and laborsaving features *they* like and want in the products they buy. Take the lead—sell Westinghouse Ranges—the Kitchen-proved ranges with every desirable advantage, plus the "tops" in cooking performance.



NEW PLATFORM LIGHTS—Opal glass. Stationary — chrome supports. Standard on Dictator, Diplomat, Challenger, Conqueror. Adjustable lights on Emperor and Regent.

NEW SURFACE SIGNALITE—Glows brightly when any one of the surface units is on *any* heat. A permanent part of the timer housing on the Emperor and Regent ranges.

NEW MINUTE MINDER—Times cooking operations for periods up to 60 minutes. Built-in on the Dictator. Accessory for Diplomat, Challenger, and Conqueror ranges.

MENU MASTER BROILER PAN—For broiling, roasting, surface cooking. Large capacity — holds 12 chops. Smokeless. Easy to clean. Standard on Emperor, Regent, Dictator.

Westinghouse *Kitchen-proved* Ranges

"The Line of Least Resistance"

A GRIP FOR ALL NEEDS

No. 1628-5 B.
"Chicago" Grip.
Maximum opening .563.
Minimum opening .115.
Safe Load, 8,000 lbs.

Here's the new "Chicago" Grip capable of handling messenger or guy strand from 3/16 in. diameter up to 1/2 in. diameter. A genuine all purpose grip that can also be used satisfactorily on bare conductors, solid or stranded, from No. 6 to No. 4/0 seven strand copper and A.C.-S.R. up to No. 3/0. A grip that even satisfactorily handles the new three-strand "copperweld" conductor. The bronze-lined jaws prevent slippage. This new grip will afford a sure hold under all conditions, with loads up to 8,000 lbs.

DISTRIBUTED THROUGH JOBBERS

Foreign Distributor: International Standard Electric Corp., New York

---

The four pamphlets listed below will be sent without charge to anyone interested. Check the ones you want:

- ☐ Safety for the Pole Climber.
- ☐ Specifications on Linemen's Belts and Safety Straps.
- ☐ The Safety Factor on Linemen's Leather Goods.
- ☐ Pocket Tool Guide.

Mathias KLEIN & Sons
Established 1857 Chicago, Ill. U.S.A.
3200 BELMONT AVENUE

Ranges: Hotpoint's new Metropolitan; General Electric

pressor, elimination of belts and gears and three-point cushion rubber mountings. Features more readily explained to a prospect are these: The Humidrawer for vegetables has a glass cover which is independently suspended so that the draw and cover may be removed separately. The door handle works three ways to open the door by a push or pull to the right, left or outwards.

G-E Ranges

By incorporating five-heat, high-speed Calrod units with the ribbon-type, flattened-top surface in all the surface-cooking area of its ranges, General Electric offers a heat for every cooking need. Benefits are increased speed, an estimated 45% less current consumption for normal cooking use and the convenience of heat without burning. The 6-qt. thrift cooker employs a three-heat unit. Each surface unit is equipped with a "Tel-A-Cook" light signal in a panel directly above the respective switch, and each of the five heats for each unit has a color signal of its own. With the switch on first position for fast starting, the panel shows red; in second position, yellow, etc. The range name-plate also lights up when the warming unit is on, and a second light winks out when the oven reaches the desired temperature. In addition to the usual pre-heat, bake and broil, the over has two other adjustments, and the five stages are controlled by a single switch. The ranges also feature the "triple oven." The low heating unit can be moved to center guides, cutting the size of the oven in half, and an aluminum sheet is placed underneath. The master oven, with unit in place at the bottom, affords ample room for two 15-lb. turkeys. A super-broiler completes the triple oven.

Hotpoint Ranges

A range for every market has been made available in Hotpoint's line of twelve models. Outstanding among the new features offered is the double-unit "directional heat oven" with its "Five-Heat Direct-A-Heat Switch." This adds a new heat—"broil" for cooking meats well done and for toasting. The five-heat feature, introduced last year in the utility-size surface unit, is also available in the giant-size unit. An indirect light distributes glareless illumination over the entire range surface. Every model except the Milford standard has a 6-qt. thrift cooker. Other talking points include: an easy "in-and-out" switch operating the warming compartment for food or dishes on the Salsbury deluxe; a built-in time chime for timing short cooking operations on the Moderne; long-life silver contact switches. Two entirely new ranges are the Metropolitan and the Bellwood, both designed to appeal to the low-price market. The former is a 36-in. range adaptable to the requirements of the small kitchen, but without limitation as to cooking capacity. It has a swing-type oven door which opens flush with the side. The Bellwood has all these features, with legs substituted for the cabinet base.

Westinghouse Ranges

Through use of a new steel alloy as the solid steel top of the Corox heating units of its 1939 line of ranges, Westinghouse announces that the "economizer" surface unit cuts monthly cooking costs about 18%. Heat output of the surface units has been increased by enlargement of the contact with the bottom surface of utensils. Westinghouse also claims that increased wattage in the new ranges' ovens reduces the current operation time to 9 mi. out of the cooking hour as compared with 12 min. in 1938 ranges; the "Economy Cooker" and the "Econo-Cooker" bring the cost of preparing a complete meal down to about 1c. Oven has both a top and bottom heating element plus a separate broiling element. The bottom unit has an output of 3,000 watts; the top, 1000 watts; the broiler, 3,000 watts. New broiler pan, made of aluminum, is 1½ lb. lighter than conventional pans. The "Economy Cooker" is a deep-well aluminum cooker set in the top of the range and regulated by a three-way control switch. The "Econo-Cooker" performs every task of the deep-well unit, but has the extra advantage of being portable and equipped with an automatic temperature control.

Eureka Range

Eureka Vacuum Cleaner Co. has gone further into the appliance business by establishing an electric range division which is manufacturing a complete portable electric range to sell at $39.95. The unit is especially adaptable for use in summer cottages. It can be plugged into any convenience outlet. Designed like an electric oven, the range has surface cooking units which fold up against the sides of the roaster. The unit is automatic and has current limiting switches which make it impossible to overtax input.

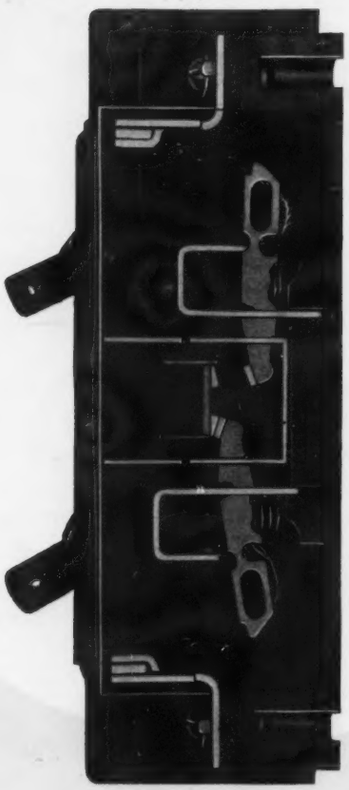
Easy Washers and Ironers

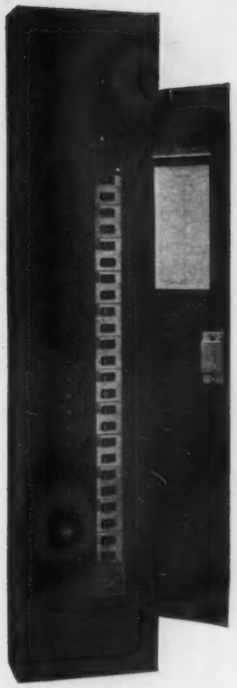
Easy's sales talks for its new washers stress old but tested points: The "Spirolator" and "Turbolator" agitators distribute clothes evenly throughout the tub and give "three-zone" washing. All raw metal edges are either rubber-covered or plastic-covered. The enamel is chip-proof because sheet metal is coated with "Bonderite." Wringers are built with a bar-type safety release extending all the way across both sides of the wringer roll. When bar release operates, both rolls stop revolving. Special safety zoning is provided in the wringer by specially raised feed boards that decrease the size of the entrance to the rolls.

(Continued on page 16)

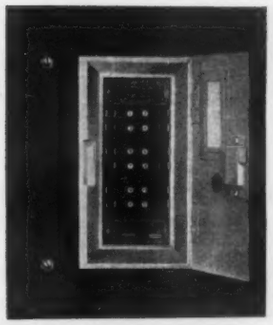
MULTI-BREAKER LIGHTING PANELS

for Low Cost Circuit Breaker Protection

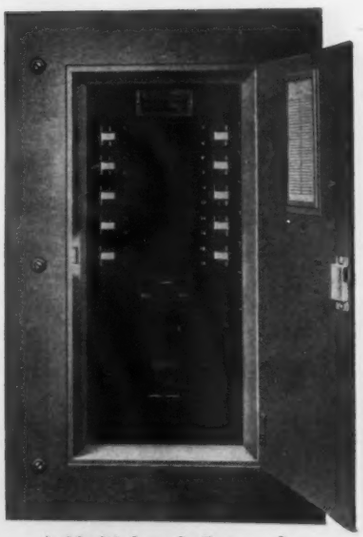




➡ Narrow column Multi-breakeR panelboard.



➡ Multi-breakeR lighting panel.



➡ Multi-breakeR panelboard with main circuit breaker.

➡ These circuit breaker lighting panels are built from Multi-breakeR units as shown in the center cut-out illustration. The simplicity of the design is the keynote to low cost, long life and trouble-free operation. There are only *three moving parts,* the springs operate under compression, and there are *no bolted or riveted joints* between terminals. By actual test, the operating life of the Square D Multi-breakeR is *many times longer* than ever before attained by a circuit breaker used for similar applications.

Square D panels are available in standard or narrow column design, 15 to 50 ampere circuits alternating current. Write for Bulletin CA543B.

CALL IN A SQUARE D MAN

SQUARE D COMPANY

LOS ANGELES - MILWAUKEE - DETROIT

IN CANADA: SQUARE D COMPANY CANADA LIMITED, TORONTO, ONTARIO

CUT OUTAGE

SPECIFY ALLIS-CHALMERS EQUIPMENT.. EQUIPMENT THAT PAYS FOR ITSELF BY INCREASING OUTPUT .. DECREASING MAINTENANCE AND OPERATING EXPENSE.. INCREASING YOUR NET REVENUE!

Are you buying expensive equipment without getting the proper return on your investment? Are your equipment dollars consumed by breakdowns and costly outage time? Then here's the answer for you . . . specify Allis-Chalmers equipment . . . the equipment that pays for itself!

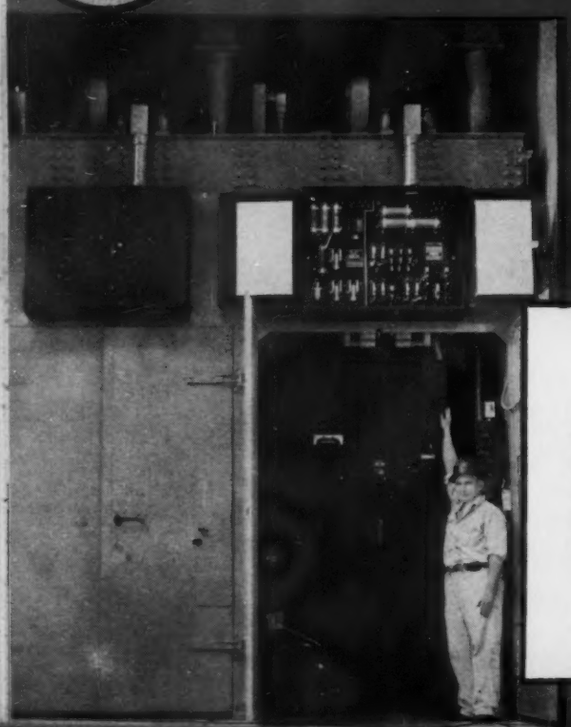
Actual records of Allis-Chalmers machines operating even under adverse conditions show that this precision-built equipment generates and transmits power without trouble . . . without constant servicing . . . without dips in the output curve!

That's why experienced engineers specify Allis-Chalmers! They know that they get the right equipment for their job . . . equipment that's engineered to meet their needs!

And they get more than that . . . and you'll get more! Since 1847 Allis-Chalmers has been advancing with industry . . . developing new products . . . new processes that cut production costs . . . make workers' jobs easier. And that 90 years of experience works for you when you place an order with Allis-Chalmers!

What's more, you get the advantages of the research constantly going on in the Allis-Chalmers laboratories and those of associated companies all over the world . . . the benefits of all the most recent engineering developments.

Put 90 years of experience to work for you! Check the equipment on the next page . . . it's geared to meet the demands of modern industry! Specify Allis-Chalmers . . . equipment that pays for itself . . . and make your equipment dollars go farther!



ELECTRICAL DIVISION

ALLIS-CHALMERS

MILWAUKEE · WISCONSIN

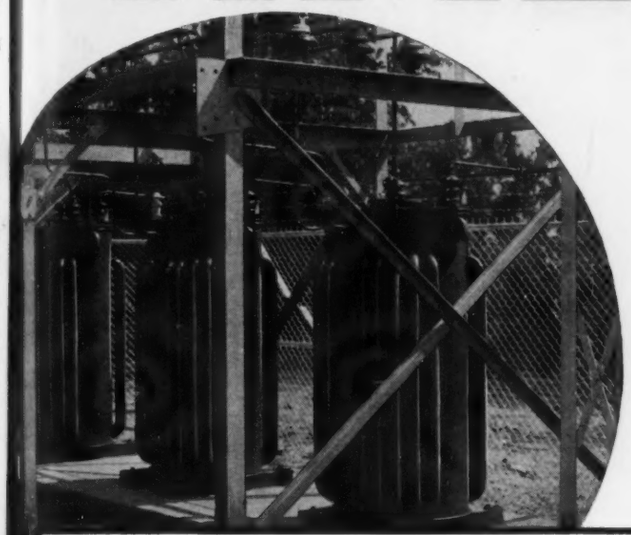
SALT LAKE CITY, UTAH — KEARNS BUILDING
LOS ANGELES, CAL. — ROWAN BUILDING
PORTLAND, OREGON — 1311 S. E. UNION AVE.
PHOENIX, ARIZONA — LAMBS TOWER
SAN FRANCISCO, CAL. — RIALTO BUILDING
SEATTLE, WASH. — HENRY BUILDING
DENVER, COLORADO — CONTINENTAL OIL BUILDING

WHY YOU SHOULD SPECIFY ALLIS-CHALMERS METAL-CLAD SWITCHGEAR!

Allis-Chalmers Metal-clad Switchgear is backed by the longest and broadest switchgear experience in America. When you specify Allis-Chalmers Metal-clad you get Proven Reliability . . . Small Space Requirement . . . Rugged Construction . . . Minimum Installation Expense . . . Amazingly Low Maintenance . . . Accessibility . . . Convenience . . . Elimination of Human Error in Sequence of Switching Operations.

No other switchgear can offer you all these features! Get proven operation! Get all the facts! Send for Bulletins 1145-B and 1192.

TIME!



DISTRIBUTION TRANSFORMERS THAT GIVE BETTER SERVICE AT LOWER COST!

Allis-Chalmers Distribution Transformers fit into your operating practice . . . readily adaptable to changing service under load conditions.

Allis-Chalmers specialized transformer engineering has developed surge-protected design . . . solderless connectors and stud bushings . . . oil-sealed inert gas protection, and many other features since accepted as general practice.

Get better service and lower your maintenance costs! Specify Allis-Chalmers Distribution Transformers! Write for Bulletin 1173!

POWER TRANSFORMERS WITH EXTRA MONEY-SAVING FEATURES AT NO EXTRA COST!

The No-Load Tap Changer gives you more efficient, safer transformer operation!

The Uni-Directional Breather cuts the number of oil filterings!

The Oil-Sealed Inert Gas System eliminates the need of periodic adjustment or replacement of mechanical operating devices. No continuous gas supply is needed! Oil is kept free of sludge and moisture!

And you get all of these features, plus others, at no extra cost! These transformers meet all kinds of special conditions of operation most economically . . . installation . . . performance . . . maintenance costs . . . all cut to a minimum!

1000

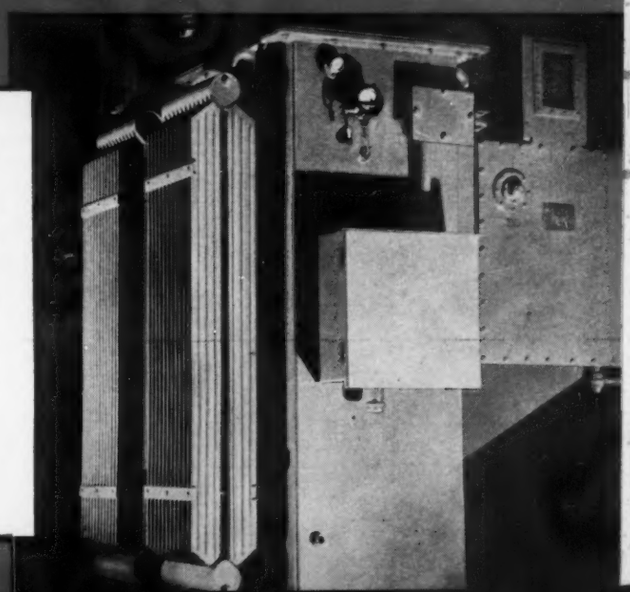
SAVE ON CONTACT REPLACEMENTS ... ON MAINTENANCE COSTS WITH ALLIS-CHALMERS 5/8% HALF-CYCLING STEP REGULATORS!

You get longer contact life with Allis-Chalmers 5/8% Half-Cycling Step Regulators! That's because there are fewer tap changes . . . extra large contacts of special non-arcing alloys.

Allis-Chalmers Regulators need only 1/4 to 1/8 the exciting kva required by other types of regulators!

All moving parts are completely immersed in oil . . . nothing to lubricate! The quick-break mechanism eliminates the motor brake. Your maintenance costs are slashed!

Learn how you can save with Allis-Chalmers 5/8% Half-Cycling Step Regulators! Contact the nearest District Office for the whole story on smoother regulation at lower costs!



GARDNER TRANSFORMERS

Assure Maintenance of Rapid Transit Schedules Over Bay Bridge

● WHERE CONTINUITY of service is essential, Gardner Transformers are chosen because of their reputation for long life and trouble-free dependable operation. That is why Gardner Transformers were selected for the important job of providing power to the interurban trains operating over the San Francisco-Oakland Bay Bridge. You, too, will find it profitable to consult our nearest representative on your transformer needs.

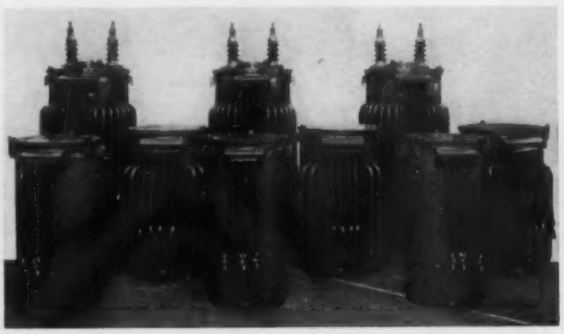
GARDNER ELECTRIC MANUFACTURING CO.

4227 Hollis St. Emeryville, Calif.

REPRESENTATIVES

Geo. E. Honn Co., 420 Market St., San Francisco, Calif.; Beesen Engineering Co., 2501 E. 52nd St., Los Angeles, Calif.; Industrial Electric Co., 1276 Denny Way, Seattle, Wash.; Modern Electric Co., 37 Richards St., Salt Lake City, Utah; Kranefeld Engineering Co., 3416 14th Ave., Denver, Colo.

Barrett & Hilp, general contractors, and T. L. Rosenberg, electrical contractor, make sure that train service will be reliable by installing 3-25 kva and 3-50 kva Gardner Transformers in the Eastbay yards of the interurban rail system. 3-100 kva Gardner Transformers were also placed in the terminal at San Francisco.



STEEL STRAND ✣ TELEPHONE WIRE

Crapo

GALVANIZED PRODUCTS

SCIENTIFICALLY MADE TO RIGID SPECIFICATIONS

Crapo Galvanized Steel Strand is a highly specialized product scientifically manufactured under direct laboratory supervision. Each grade and size is produced from start to finish to meet the exacting demands of the service for which it is intended. Each wire used in forming a particular size and grade is made from the same special steel, processed in the same way, and galvanized by the *Crapo* Process.

For further information consult the nearest distributor of *Crapo* Galvanized Products, or write direct!

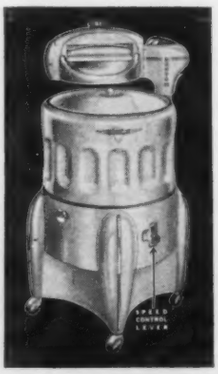
INDIANA STEEL & WIRE CO.

Muncie, - - Indiana

Adequate room is provided for insertion of clothes, but larger objects cannot enter rolls without striking the pressure release. Easy ironers feature three-way speed control. Clothes rack is adjustable vertically and horizontally. Swinging table top forms a convenient kitchen work table. Knee control is adjustable.

Barton Washers

A new speed control for both washing and wringing is provided in Barton Corp.'s 1939 washers. Instead of just one washer speed, three are available. The "slow" is said to be especially desirable for such articles as the particular housewife usually washes by hand. Three wringer speeds are also available, and the wringer pressure is controlled so that the proper pressures can be selected as required. Changes from one speed to another are accomplished by a finger-touch control lever. Full agitator stroke is maintained at all speeds.



Barton washer

Voss Bros. Washer

A full-sized washer contained in a kitchen table—that is the 1939 offering of Voss Bros. Mfg. Co. Advantages of such an appliance are obvious: The housewife can save space by eliminating the usual washer from the kitchen, basement or washroom. She has a strong, enamel-topped kitchen table at all times. She saves carrying clothes beyond the kitchen. The job of washing is brought out of a dark basement into the well-lighted kitchen. Wringer of the machine is easily folded into the rinse tub for storage. Capacity of the washer is 7½ lb. of dry clothes. Both tubs are easily drained through faucet or by a siphon. A high-speed rotary pump empties both tubs quickly.

Voss Bros. washer in table form

Westinghouse Washers and Ironers

The sheen effect of hand ironing is said to be produced in the newest Westinghouse ironer by the rocker action of the roll shuttling under the shoe as the fabric is fed through the machine. Foot-pedals control the speed at which the roll turns so that the operator's hands are free. The roll is completely open at both ends, thus making possible creaseless ironing and providing more ironing space. This feature is also said to eliminate the heat that is usually thrown in the face of the operator. Control panel of the ironer tilts forward when the indentation on the switch panel is pressed. Glass-wool insulation helps to produce about 25% more usable heat.

More attractive and more efficient wring-

(Continued on page 18)

GET ALL THREE OF THESE BENEFITS" WHEN YOU BUY OIL CIRCUIT BREAKERS

HUNDREDS OF RELIABLE INSTALLATIONS
Here are two being installed in Washington

1 FAST OPERATING

Our Motor Control assures fast closing and opening for 115 to 287-kv. breakers. In additions, immediate first reclosing for the lower interrupting ratings. Motor-wound springs operate the breaker. Equipped with emergency hand-winding device, giving fast closing for manual operation.

2 SHORT ARCING TIME

For short arcing time, reduced contact burning, no tank pressures, less oil carbonization—utilities rely upon Pacific Electric breakers equipped with Expulsion Chambers which make immediate reclosures possible. Operating men report a saving in maintenance due to low oil carbonization and negligible arcing-tip burning.

3 LOW-COST METERING

You save money as separate tank, oil and bushings are not needed when you use our exclusive CP Bushing-Type Current Transformers of high accuracy.

See Our Exhibit at the San Francisco Fair.

YOU SAVE MONEY ON LOW FIRST-COST, HAVE QUICK, SAFE INTERRUPTIONS AND FAST CLOSING . . .

TYPE RWE
115 to 287 kv.

Your good judgment will tell you that you will save money on the first-cost of Pacific Electric breakers when you obtain our proposals.

You will save money on our new Motor Control and its installation. For rectifiers or large expensive station batteries and costly cables are not needed. Moreover, such accessories are less reliable; while slow operating breakers are more difficult to synchronize, either automatically or manually. But Pacific Electric Motor Controls, manufactured successfully for 16 years, assure reliable service and fine public relations.

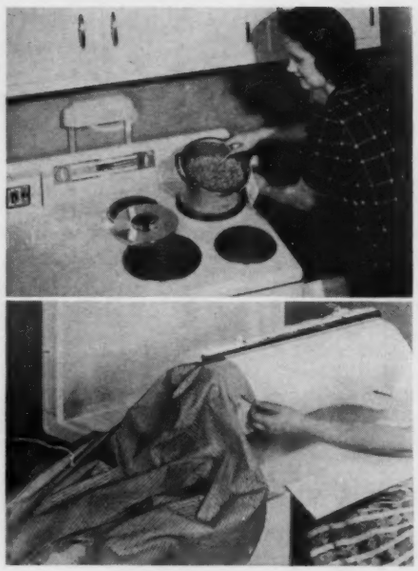
The good design and precision construction of every detail of Pacific Electric breakers offer quick, safe interruptions and fast closing. You can depend upon that! Let us send you the full details.

PACIFIC ELECTRIC MFG.

Pacific Electric Mfg. Corporation.

5815 THIRD ST., SAN FRANCISCO, CALIF. DUNES HIGHWAY, GARY, INDIANA

Representatives in Principal Cities



Westinghouse range and ironer

ers, bottle-neck tub construction and increased washing capacity are included in the improvements offered in Westinghouse's 1939 washers. The new spinner-dryer is virtually a home laundry in itself. This wringerless unit washes, blues, rinses and damp-dries. The washing and damp-drying can be performed simultaneously. Two convenient levers give full control of all operations. The deluxe washer has a heavy-duty wringer and a tub capacity of 9 lb. per load. A touchbar safety release frees the roll pressure and a reset lever at the end of the wringer resets the pressure.

Hotpoint Water Heater

A 2-gal., non-pressure, automatic electric water heater which can be mounted right over the sink or basin has been announced by Hotpoint. No special connections are needed for the heater, which comes in very handy when only a small amount of hot water is needed. A 6-ft. rubber-covered cord at the back of the heater plugs into any ordinary 115-volt wall outlet. Heating is accomplished by a 1,150-watt Calrod unit immersed in water. Thermostat to maintain even temperature is at the rear.

Universal Tap

A universal-type, combination Tee-parallel tap is being offered by Thomas & Betts Co. The fitting, in three body sizes, takes any kind of wire, cable or tubing from 1/0 to 500,000 circ.mil. on the main and No. 14 to No. 4 on the branch. The tap is only slightly larger than the cable, over insulation, and can therefore be quickly and neatly taped. It is cast in one piece of high conductivity copper alloy.

Fuel-Consumption Meter

Electrical men who operate fleets of automobiles or trucks will welcome S.F. Bowser & Co.'s "Akraflo" fuel-consumption meter. The meter is a complete measuring and recording system consisting of displacement meter and recording dial. It enables the user to keep an accurate check on fuel purchases and on his drivers; supplies cost data; checks on motor efficiency, etc. In the standard model the totalizing dial is integral with the meter. Where direct readings are not possible, the remote dial model can be used. A built-in strainer prevents grit from entering the meter; an air separator keeps out air.

(Continued on page 22)

THERE ARE "BESTS" IN EVERY INDUSTRY

IN ELECTRICAL APPLIANCES IT'S

Sunbeam

Automatic **MIXMASTER**
Double Automatic **IRONMASTER**
SILENT AUTOMATIC TOASTER
Automatic **COFFEEMASTER**
SHAVEMASTER
FLAT TOASTER • FAN HEATER
GLASS COFFEE MAKERS
WET-PROOF HEATING PAD
MASTER PLUG & CORD SET

MADE AND GUARANTEED BY
CHICAGO FLEXIBLE SHAFT COMPANY
5600 West Roosevelt Road, Chicago, Ill.
316 Commercial St., Los Angeles, Cal.
1619 Shenandoah Dr., Seattle, Wash.
224 S. W. Temple St., Salt Lake City, Utah
49 YEARS MAKING QUALITY PRODUCTS

Stronger than STEEL
BLACKBURN CONNECTORS are made completely of Duronze, a silicon bronze actually stronger than steel. Because of their great strength, Blackburn Connectors can be used over and over again—a real economy. For reliability, economy and ease of installation, insist on Blackburn One-Piece Connectors.
JASPER BLACKBURN PRODUCTS CORP.
Main and Clinton Sts. St. Louis, Mo.

PRACTICAL SALES GUIDES

•

When reading **Electrical West,** remember these words of Ralph E. Gale, commercial manager of Idaho Power Co.:

"I want to take this opportunity to tell you what a good job I think you have done with these Appliance Sales Guides. They are particularly adaptable for use by salesmen because they are practical; they bring out objections that are made by customers and then they proceed to answer these objections in a very logical manner."

Electrical West's Sales Guides are a short-cut to quick, easy, sure-fire sales. Use them.

MRS. AMERICAN HOUSEWIFE SPEAKING:

(MORE THAN ONE HUNDRED THOUSAND OF HER)

"YES—I'D SAY CHROMALOX UNITS IN ANY RANGE YOU BUY"

Why **CHROMALOX UNITS** *sell ranges*

METAL TO METAL CONTACT
with bottom of cooking vessel means heating by conduction — the fastest way of transmitting heat.

"TWO-UNITS-IN-ONE"
permits selection of heating area to fit the size of the utensil, eliminating wasted heat.

THE PERFECTLY FLAT TOP
results in easy cleaning as well as economical cooking.

FOOLPROOF CONSTRUCTION
makes these units immune to the usual harmful effects of spill-overs and heavy handling.

SUPERIOR TERMINAL DESIGN
all connections "Monel" metal—non-corrosive and heat-resisting.

EXTRA LONG SERVICE LIFE
practically eliminates trouble-calls and profit-less servicing.

GET THE FACTS
about Chromalox units that have helped to sell thousands of ranges.

"I have them on my range and they certainly are fast-cooking, and that saves both time and money. Besides they have two rings, one inside the other—I think they call it "two-units-in-one"—and so when you cook with a small pan you use only the small inside ring. You can see how that saves electricity . . . yes, they're the only units made that way. They're all flat on top, too, and if you spill anything on them it doesn't matter—you just wipe it off. Most good ranges seem to have Chromalox units, so you won't have any trouble getting them."

Through Chromalox Super-Speed Units, more than one hundred thousand American housewives have discovered the speed and economy and cleanliness of electric cooking. These women are spreading the word. Sell Chromalox-equipped ranges. **Be ready for the buyer who says, "I want a range with Chromalox units".**

Write us or our nearest representative

MONTGOMERY BROTHERS—911 Western Ave., Seattle, Wash. • 1501 N.W. Kearny St., Portland, Ore. • 61 Fremont St., San Francisco, Cal. • 912 E. Third St. Los Angeles, Cal. • THE PETERSON COMPANY—1921 Blake St., Denver, Colo.

EDWIN L. WIEGAND CO., 7540 Thomas Blvd., Pittsburgh, Penn.

INCREASE YOUR *Money-* KELVINATOR NATIONAL

Sidney Edlund
President Kelvinator National Salesmen's Institute

★ ★ ★

THE Kelvinator National Salesmen's Institute has prepared a remarkably practical study course which combines sales theory and practice so as to be of constant daily use to retail appliance salesmen.

Mr. Edlund, who has already achieved national prominence through his work in training men in a number of different industrial organizations, writes in: "Not only is this Institute project a 'hot' plan, but the 'student body' looks to me the best timber any organizer could be called on to shape. I congratulate *them* on being tied in with a business whose leader thought up this plan; and I congratulate Kelvinator on having the kind of manpower to insure its success.

"The soundness of the whole set-up is reflected in the Institute's personnel. William Rados, for example, brings an unusually broad experience in man-training and building to the Manager's post. He will have entire charge of the preparation of the Institute's program and maintain constant contact with the salesmen.

"If you were only half as sold on this project as I am you wouldn't need urging to write in now for the Institute's booklet."

Solve the 3 Big Problems Faced by the Appliance Dealer Today

- **MAKE EVERY SALESMAN PROFITABLE**
- **GET GOOD SALESMEN**
- **KEEP GOOD SALESMEN**

ALL THIS MAY SOUND like a big order, but those who have seen the Institute program in its entirety have declared it to be the greatest step forward in sales education ever taken by any manufacturer in the appliance field.

First of all, the Institute is staffed with men of outstanding prominence in the field of sales education.

Second, its one job is to enable salesmen to make more money, for themselves and the dealers for whom they work.

Third, it provides not only a complete selling course—covering products, general salesmanship, and the use of promotional campaigns—but offers every salesman a real incentive to finish the course and profit by its use.

And only those dealers who sell Kelvinator household appliances in 1939 will be able to employ this effective, three-edged selling tool.

Kelvinator invites every household appliance dealer who is interested in making more money in 1939 to send for the free booklet and get the complete story. There will be no charge or obligation.

Just tear off the coupon below, and the booklet will be sent to you.

FORGET EVERYTHING YOU HAVE EVER KNOWN ABOUT "SALES TRAINING"

In a month or two, the entire industry will be talking about the Kelvinator National Salesmen's Institute, and you should know the facts—even though you are not now a Kelvinator dealer.

Talk to your Kelvinator distributor—or to his wholesale man—*now*, about the Institute. Or clip the coupon for a booklet that will give you the entire story. KELVINATOR DIVISION, Nash-Kelvinator Corporation, Detroit, Michigan.

KELVINATOR NATIONAL SALESMEN'S INSTITUTE
14250 Plymouth Road, Detroit EW-2

Please send me a copy of your booklet on the Kelvinator National Salesmen's Institute. I understand that this request places me under no obligation whatever.

DEALER'S NAME.....

ADDRESS.....

CITY.....STATE.....

MAIL THIS COUPON TODAY ⬅

—Making POWER THROUGH SALESMEN'S INSTITUTE

The Refrigerator That Was 25 Years in The Making

Today Kelvinator is proud to present the climax of 25 years of pioneering achievement . . . the new Silver Jubilee models.

Completely new . . . in design, beauty, and mechanism . . . as revolutionary as the very first electric home refrigerator, which was made by Kelvinator.

Here are just the quick facts. For the full story, talk to your Kelvinator distributor.

The Polarsphere...most efficient of all refrigerating units, cost-cutting and trouble-free. Enough power to keep 5 refrigerators cold.

Dry Storage Bin for Vegetables . . . extra storage space for onions, potatoes, turnips.

Steaks and Chops kept fresh and juicy for days in this glass-topped Cold Chest. Holds up to 14 lbs. of meat cuts.

Speedy Cube Release loosens cubes in a flash—by an easy lift of a lever. You get 72 big ice cubes for 1¢ at national average electric rates.

Twin Glass-topped Vegetable Crispers let you see at a glance inside. Salad greens and vegetables are kept garden fresh for days.

New Wider Front increases capacity without increasing size. No more fumbling and groping or knocked over dishes and bottles.

1914 *Celebrating the 25th Anniversary of the Oldest Maker of Electric Refrigerators* 1939

Silver Jubilee KELVINATOR

MAYDWELL & HARTZELL
INCORPORATED

Engineers
AND
Manufacturers' Representatives

☆ ELECTRICAL TRANSMISSION AND DISTRIBUTION LINE MATERIALS

☆ TELEPHONE AND TELEGRAPH LINE MATERIALS

☆ STEEL PRODUCTS

SAN FRANCISCO LOS ANGELES PORTLAND, ORE.

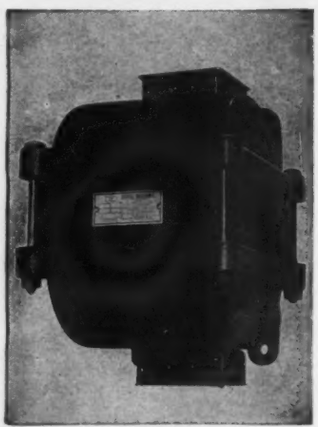
What will an **AGENCY ACCOUNT** *do for me?*

Let us answer this question for you by sending you our interesting booklet, *An Introduction to Agency Service,* describing the modern, economical way to handle securities.

Just ask for Booklet M-3

CROCKER FIRST NATIONAL BANK
OF SAN FRANCISCO
California's Oldest National Bank

YOU SAVE



With **JEFFRIES**

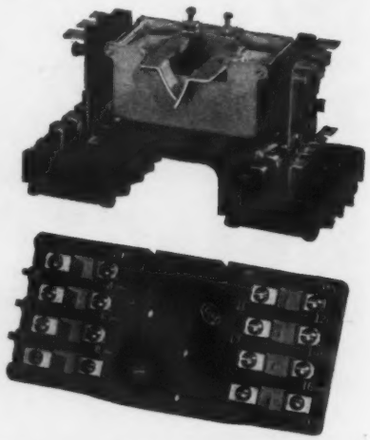
AIR COOLED TRANSFORMERS

● With a Jeffries Air Cooled Transformer money can be saved. The Air Cooled construction lengthens the life of the transformer and lowers repair costs. Plant expansion and extension can be made economically for a Jeffries Transformer provides the voltage change at the point desired without the need of long and expensive conduit runs. Besides a complete line of standard transformers, special designs and voltage furnished to order. Type S. S. Transformer 1 to 5 K.V.A. illustrated.

JEFFRIES TRANSFORMER COMPANY
5706 LONG BEACH AVE., LOS ANGELES

Twin-Latch Relay

G-M Laboratories' new twin-latch relay carries loads up to 30 amp. a.c. and 10 amp. d.c. but requires only 8 watts for operation. The company says it is ideally suited for use



in three-wire thermostatic control systems or similar circuits. The relay consists of two coils and two hinged armatures, each of which carries a latch arm. The latch arms interlock, thereby holding one armature in the energized position until the other armature operates. In operation, as one coil is energized the armature movement simultaneously breaks the circuit as it locks the relay in the new position. This momentary impulse feature gives the advantages of low power consumption, elimination of hammering or vibration on a.c. current and no false operation through failure of current supply.

NEW BOOKS

Fractional HP. Motors

"Fractional Horsepower Electric Motors," by Cyril G. Veinott, design engineer of Westinghouse Electric & Mfg. Co.; McGraw-Hill Book Co.; $3.50. This illustrated, 431-page volume is as easily understood and as complete a work on all types of small motors as any repair shop or motor specialist might want. The book starts with a description of what the name-plate rating stands for on a motor and proceeds to tell what causes a motor to run. There follow chapters on every type of fractional horsepower motors, their differences, principles of operation, winding diagrams, connection charts and service problems.

Winding A.C. Motor Coils

"Winding Alternating Current Motor Coils," by G. A. Van Brunt and A. C. Roe, McGraw-Hill Book Co., available at 883 Mission St., San Francisco, $3. This is a practical book. Its purpose is to enable engineers and repairmen to modernize alternating-current motors and generators by redesigning and rebuilding the windings or to replace defective windings in modern equipment. Although it goes into fundamentals, it is not a book of theory. Many drawings and many photographs are used in combination with simple language to present a clear, complete, step-by-step account of the best modern winding practice. A chapter on glass insulation covers the recent developments which make this material available and practical for field use and includes tables which summarize its physical and electrical characteristics.

OKOSHEATH

A NON-METALLIC SHEATHED CABLE

OKOSHEATH is noted for its extreme simplicity. Just a tough rubber belt around the conductor. That is Okosheath. Simple in design—but it lasts.

There is nothing in its construction to deteriorate and rot away. Enormous quantities of Okosheath, used both in conduit and buried directly in the ground, have demonstrated its durability.

Okosheath is effectually moisture resistant. It is clean, smooth, flexible, light in weight, small in diameter; easy to handle and install. A lineman can splice it. Strong and compact, Okosheath is the cable for tough pulls.

Okosheath opens the way for the new trends and service demands. Besides its lower first cost, it saves in maintenance. The dollar benefits are both ways.

OKONITE **THE OKONITE COMPANY**

Founded 1878

EXECUTIVE OFFICE: PASSAIC, NEW JERSEY

HAZARD INSULATED WIRE WORKS DIVISION — THE OKONITE-CALLENDER CABLE CO., INC.

New York Boston Seattle Buffalo Chicago Dallas Detroit Atlanta
Philadelphia Los Angeles Pittsburgh St. Louis Washington San Francisco

OKONITE QUALITY CANNOT BE WRITTEN INTO A SPECIFICATION

ROLLER-SMITH

Announces

the consolidation, as of February 1st, 1939, of its Executive Offices, (located prior to February 1st in New York City), with its Works at Bethlehem, Pa. After February 1st all activities of the Company will be concentrated at the new Headquarters at Bethlehem.

The Sales Agencies in New York City and all Principal cities in U.S.A. and Canada are not affected.

ROLLER-SMITH COMPANY
Electrical Measuring and Protective Apparatus

Makers for *over forty* years of Electrical Measuring Instruments, indicating and graphic; air and oil Circuit Breakers; Switchboards; Rotary Switches; Voltage Regulators and Instrument Transformers.

MAIN OFFICE AND WORKS
BETHLEHEM, PA.

WIRE JOINTS WITHOUT SOLDER!

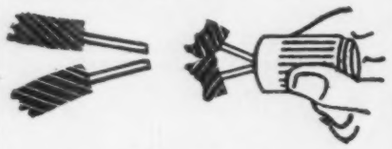
(Less Expensive—Greater Safety)

CONVENIENT TO USE!

IDEAL

IDEAL "Thread-on" Wire Connectors, for **solid** or **stranded** wires, are accepted as **standard** by the electrical industry. They make uniform, perfect connections—**without solder, tape** or **hazardous open flame!**

The Connector is screwed on, just like a nut on a bolt, pressing clean threads into the wires, and forming a joint that is **better electrically, stronger mechanically.**



Just screw on.
No twisting of wires necessary.

Available in a variety of sizes for joining from 2 No. 20 to 3 No. 10 wires.

FULLY APPROVED—**Listed by Underwriters' Laboratories, Inc.**

samples upon request

Electrical Products Division
IDEAL COMMUTATOR DRESSER COMPANY
1042 Park Avenue **Sycamore, Illinois**

PRODUCT DATA

Free to you . . . Any of these instructive bulletins simply by addressing a post card to ELECTRICAL WEST and asking for the desired bulletin by number.

201:

FOR SOME TIME there's been talk of General Electric's new "Spirakore" transformer. A lot of electrical men were wondering how G-E managed to fit one closed ring into another closed ring. It was said to be something akin to magic. At last G-E comes to the rescue with a complete description of how this trick is done. The booklet—beautifully printed and illustrated—is called "The G-E Spirakore Transformer" and it bears the number GES-2038. Starting from the beginning, the uninterrupted story details how transformers were originally made and how they are now made by this new process. At the end of the story are the benefits to be derived from using these units. They are said to be smaller in size, lighter in weight and improved in performance. If you want to read this story, write ELECTRICAL WEST for Product Data item No. 201, and be sure to specify G-E bulletin GES-2038.

202:

EVERY LARGE USER or collector of lubricating oil will find Filtrol Corp.'s new 16-page bulletin "Retrol and Its Use in the Re-Refining of Used Oil" a serviceable piece of information. In non-technical language the bulletin describes the methods and equipment necessary to reclaim used oil with "Retrol," the activated clay. Ask for Bulletin No. 202.

203:

"'LO-MAINTENANCE' MOTORS are built for extra years of money-saving operation." They are "compact, sturdy and accessible." These are claims made by Allis-Chalmers in its 8-page, profusely illustrated pamphlet on squirrel-cage induction motors. Title is "Save on Service Costs with Allis-Chalmers 'Lo-Maintenance' Motors." Several pages are devoted to case studies of motors which have been in operation under adverse conditions. Also included are illustrated descriptions of construction details and a table giving the common types of squirrel-cage motors and their applications. Write for No. 203.

204:

FIRST OF THIS MONTH'S catalogs is that of Roller-Smith Co. It covers a complete line of 3- and 4-in., round and square, a.c. and d.c. ammeters, milliammeters, microammeters, voltmeters, single and polyphase wattmeters and pyrometers. With the publication, Roller-Smith presents for the first time its new line of 4-in. square instruments. These are available in both surface and flush models. If you want more information on this subject, ask ELECTRICAL WEST for No. 204.

205:

SECOND CATALOG is for those people who use portable electric tools. It is published by Black & Decker and it has 56 pages. Particular attention is called to three new units: the 3/16-in. Hornet drill, said to be the smallest and lighest-weight production drill ever offered on the American market; the 5/16-in. ball-bearing utility drill, and a new portable electric hammer. All the dope is offered in Bulletin No. 205.

206:

"BRISTOL Co.'s Metameter System of Telemetering provides utility and plant executives with a practical means of bringing vital information concerning operations taking place a few hundred feet or many miles away, to a central point where records of such information can be seen in the making and used to quickly analyze and correct abnormal conditions long before they would otherwise be detected." In this way, Bristol introduces its newest booklet describing the "Metameter System of Telemetering." The system is fully outlined and the devices pictured. More detailed information is given on telemetering for pressure, liquid level, flow, temperature, mechanical motion and gate position, voltage, current, power, totalized power load and speed of travel and rotation. Four pages of typical installations are included. Write for Bulletin No. 206.

207:

DATA ON disconnect switches and fuse mountings, representing a construction believed to be a cross-section of the best features of indoor design, are offered in Delta-Star Electric Co.'s 32-page booklet. Ask for Bulletin No. 207.

LETTERS

"Front Men"

DEAR SIRS:

I was reading over the December issue of ELECTRICAL WEST and I came across the editorial, "Front Men," by Mr. Telligan. I want to say that I think this is one of the best short articles on this important subject that has appeared. It is interesting to note throughout all of the trade periodicals received that considerably more space is being given to this subject, and I personally think that it is one of the most important subjects which can be brought to the attention of the utility people. We all are appreciative of the fact that a pleasant customer approach is necessary, but the more information and articles that appear on this subject, the greater number of ideas soak in.

We should like to place a reprint of this article in the hands of all of our employees.

C. C. BAKER,
Secretary and Treasurer
Colorado Central Power Co.

Pigs

DEAR SIRS:

I have been looking at the back cover page of ELECTRICAL WEST, January '39, and I have had a good laugh over the very appropriate illustration of "More Outlets Needed."

The fellow who thought that idea out deserves some real praise. It appeals particularly to my rural mind. It hits the point from a new angle. There's a fertile mind some place in the PCEB.

H. B. WALKER,
Professor of Agricultural Engr.
Univ. of California,
Davis

New Layout

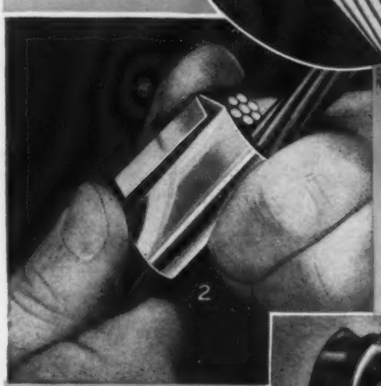
DEAR SIRS:

I never am given very much to making extravagant statements, but I do think that the changes you have made in the layout of ELECTRICAL WEST are very good ones and I think you are to be congratulated on your decision to make them.

I hope that the decision proves to be helpful to you in getting more business, but whether it does or does not, you certainly will have the satisfaction of knowing that you are doing a better job for the big boss, namely, your reader.

C. C. CONNER,
Aluminum Co. of America

SAVE INSTALLATION TIME—IMPROVE APPEARANCE AND SAFETY



with KEARNEY ACCESSORIES specially designed for the job

ELIMINATE sharp corners of guy guards that might induce claims for injury... get 100 per cent visibility... Kearney Full-Vu Guy Guards are full round—no sharp corners or exposed bolts.... Remove hazards of frayed wire ends—use strand bands or guy wire clips for neatness, plus safety.... Install house knobs that fit flush, even though screws are put in on an angle. Floating screws in Kearney Fit-Rite Wire Holders afford this advantage, at no extra cost.... Support oval or round cable with the revolutionary Lay-Cit Service Cable Grip—it doesn't injure braid sheath or conductor insulation; holds under ice load and wind pressure on spans up to 125 feet.... These are just a few minor Kearney Pole Line Accessories, carefully designed to increase efficiency—improve appearance—help you do better jobs more quickly and profitably.

other ACCESSORIES AVAILABLE

Many other items are shown and described in Bulletin 300. Order these products with assurance of satisfaction guaranteed. Write for latest prices and quantity discount.

1 *Full-Vu Guy Guards will not chafe guy wire. Available in 7 or 8 feet lengths.*

2 *Kearney Strand Bands and Guy Wire Clips are inexpensive—made in variety of sizes for your requirements.*

3 *Fir-Rite Wire Holders are made in three styles—insert (shown) also band and spool types.*

4 *Kearney Lay-Cit Cable Grips come in two types to handle range of sizes.*

SEE MANY TIME AND MONEY-SAVING ITEMS IN THIS BOOK

IF YOU DO NOT HAVE A BULLETIN NO. 300 WRITE

Exclusive Sales Representatives

MAYDWELL & HARTZELL INCORPORATED

LOS ANGELES • SAN FRANCISCO • PORTLAND

EXCLUSIVE DISTRIBUTORS

GRAYBAR ELECTRIC CO., Seattle, Portland, Tacoma, Spokane • WESTINGHOUSE ELECTRIC SUPPLY CO., Phoenix • J. R. BRADLEY CO., [illegible]

CLOSE CLAMPING JAWS AROUND CONDUCTOR.. conductors up to 2¼" dia.

READ CURRENT DIRECT ...1 to 500 Amperes

Now! A WESTON MULTI-RANGE CLAMP-AMMETER

Providing

BROADER UTILITY
MAXIMUM SAFETY
GREATER ECONOMY!

With *no* connections to make, *no* interruption of circuits... the self-contained WESTON Model 633 Clamp-Ammeter provides a simple, quick method of measuring AC current flow through insulated or non-insulated conductors. Remote indications, too, may be had... up to 50 feet from the clamping jaws... by plugging the quickly detachable Model 301 into a special carrying case available for the purpose. Some of the outstanding features of this new Clamp-Ammeter are described at the right. In addition, Model 633 is *attractively priced*. Complete details may be had from the WESTON representative near you, or by returning the coupon below.

6 current ranges ...10/25/50/100/ 250 and 500 amperes

Famous WESTON Model 301 instrument . . . assures long, dependable service

For insulated or non-insulated conductors up to 2¼" diameter

Accuracy guaranteed better than 3% between 50 and 70 cycles

Sturdy bakelite case, handle and trigger . . . for maximum safety

Temperature error less than 1% from 32° to 110° Fahrenheit

Clamping jaws heavily insulated . . . protects operator . . . prevents short circuits

Man sized handle ...proper balance for easy handling

Weston Electrical Instrument Corporation,
577 Frelinghuysen Avenue, Newark, New Jersey.

Send literature describing the new WESTON Clamp-Ammeter.

Name.....

Address.....

City..... *State*.....

Eicher & Bratt,
263 Colman Bldg.
Seattle, Wash.

PACIFIC COAST REPRESENTATIVES
Herman E. Held
420 Market Street
San Francisco, Calif.

A. A. Barbera,
Subway Terminal Bldg.
Los Angeles, Calif.

Substation Capacity at $15.84 per kva

THE EXPERIENCE OF ONE POWER COMPANY WITH DISTRIBUTION CAPACITORS

The Problem

In 1936, an analysis of summer load curves by the Kansas City Power & Light Company showed new peaks on some of its substations because of refrigerator and air-conditioning load. Fully loaded or overloaded conditions resulted. The subtransmission cables to the substations were also involved. Inasmuch as the regulation and voltage conditions on the feeders were satisfactory, the problem became one of reducing the load on the substation and cable.

The Solution

There were several ways to meet the situation. After a careful study of all factors the engineers selected pole-mounted capacitor units, to be installed near the ends of the distribution feeders, as the most desirable and most economical solution. Such installations would reduce the substation load and reduce the feeder load and losses by improving power-factor on the feeders.

The Result

The most important substation involved was Substation R. On the lines from this substation 3060 kva of capacitors were installed at a cost of $9.32 per kva. As a result, 1800 kva of capacity was gained at a cost of $15.84 per kva. The performance of the capacitors in service has lived up to expected results in every respect.

Your Opportunity

Somewhere on your system—probably in a number of locations—lie opportunities for the profitable application of G-E Pyranol capacitors. It may be to gain added substation capacity at low cost or it may be to gain feeder capacity, reduce voltage drop, or reduce losses. In any case, it will pay you to investigate this economical, reliable means of gaining capacity. Ask your G-E representative about Pyranol capacitors or write for Bulletin GEA-2746. Address General Electric Co., Dept. 6-201, Schenectady, N. Y.

VISIT THE GOLDEN GATE INTERNATIONAL EXPOSITION, LIGHTED BY GENERAL ELECTRIC

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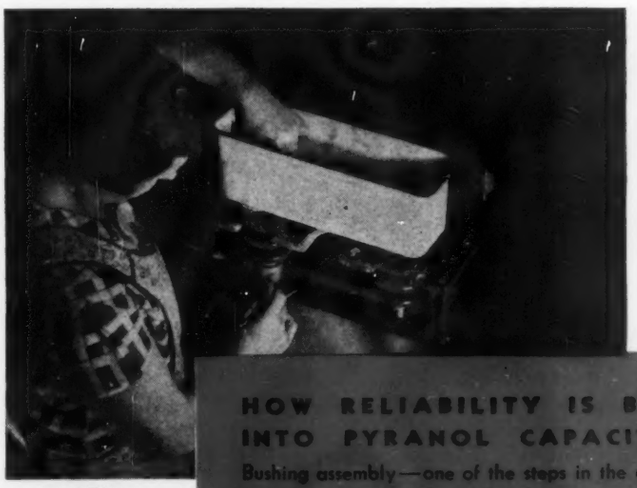

THE OPERATING RECORD OF PYRANOL CAPACITORS OVER 99.8%

HOW RELIABILITY IS BUILT INTO PYRANOL CAPACITORS

Bushing assembly—one of the steps in the carefully controlled manufacture of Pyranol capacitors which is responsible for their remarkable service record. Wet-process-porcelain bushings are used and liberal creepage distance is provided, which minimizes the possibility of flashover—even when dirt, dust, or fumes are encountered. The interior is filled with a solid Pyranol compound for increased electrical strength.

GENERAL ELECTRIC

360-142

ELECTRA'S HUSBAND

Opportunity for the Brown Kid

"REMEMBER the Brown kid that you helped get a job when he graduated last summer?" Electra asked. "Well I saw his mother today and he is quitting. He says there is no future in this electrical business of yours. He's taking an examination for a government engineering job. She wants you to talk to him."

"I will and I'll tell him plenty," I said, laying aside the copy of the evening paper which reported the probable increase in the U. S. debt to $44,500,000,000. "So he thinks there is a future on the public payroll, does he? Well there won't be unless businesses like the one that provides you with this house and your clothes and car and food are able to produce and earn and save and pay taxes."

"That argument won't sway him any," Electra countered. "It's his future he is thinking about. What are you going to tell him?"

"Just a few simple truths about the electrical industry," I replied. "For instance this industry is an outstanding illustration of survival and opportunity. In its brief sixty-year career it has survived seven major depressions. It has grown and progressed and prospered when industries of like technique have deteriorated. Look at the railroads. While the electrical industry has been growing in stature, in service and in ability to contribute more and more to modern living standards, they have been slipping down the skids. Why some experts say that 70% of the railroads are bankrupt today."

"Stick to the subject," Electra jibed. "You were rehearsing your story for the Brown kid."

"Please don't interrupt and I'll finish. Another thing that assures a future in this business is the constant flow of new knowledge from the scientists in the research laboratories. Some one once said that this industry had back of it the resources of three great houses—the house of science where new truths were being discovered, the house of invention where these truths were harnessed for practical application and the house of promotion where the inventions were popularized for the good of mankind. That's just one of the things that spell opportunity for young fellows.

"Did you ever stop to realize that the electrical industry has made almost as much progress in the nine years since the depression as it did in the fifty years that preceded the fateful day in October, 1929, when even you thought that the country had gone to hell in a hand basket? Well it has. Can you name some of the new products of electrical genius which have been given to the public since then? Here are nine of them—one for each year: the electric shaver, the fluorescent lamp, the self-tuning radio, the mercury incandescent lamp, the cathode ray tube which will give us television this year, the sodium vapor lamp, air-conditioning, high-speed, automatic electric welding and the electric clock. Nine years ago these were playthings in the laboratories; some of them even had not been thought of . . ."

"And I suppose you are going to tell me that . . ."

"YES, there will be more like them. I can't tell you what they will be. If I could, I'd be laying plans to cash in on some of them. People laughed at Jules Verne's stories yet all of the things he predicted have materialized. You and I can rest assured that today's electrical miracles will be dwarfed by those of the next decade.

"But there is one point about this industry that is more significant than all of the others. It offers inexhaustible opportunities for freedom, for independence, for initiative, for enterprise. Since its very beginning it has preserved the opportunity for men to venture, to dare, to risk, to produce. And that is an accomplishment in this day of 'isms.' Yes the channels of opportunity have been kept open and, depend on it, they will remain open for some time to come.

"You sound like you are keen about your industry," Electra interjected as I paused for a moment.

"I am. If I wasn't, I'd get out of it."

ELECTRA may be married to an electrical man and, deep down, she may have a great love for the electrical industry, but give her sufficient reason and she'll pan the living daylights out of everything we're doing. Sometimes I think she's justified. For example:

First thing she said the other night when we sat down to dinner was: "You know those young Winterbottoms we met a while ago. Well I ran into her today and she was hopping. Mad as a bellowing baby. And guess why."

"Someone in the electrical industry," I said. I was very positive about it.

"Right," Electra said. "A refrigerator man. Or, to be more exact, several refrigerator men."

And then began the most blasphemous speech Electra has made in months. It seems that the Winterbottoms rented an unfurnished apartment. The owner had just put in an electric refrigerator.

Within a few days after the Winterbottoms had moved in, the refrigerator went on the blink. They complained to the landlord, an obliging sort of fellow. He called in one of the refrigerator dealer's repair men. The repair man took a look at the refrigerator, poked round in the motor, set a valve and, left the instructions that the cold-indicator was set for Stop 4 and must be left there.

The refrigerator went back to work. For maybe three weeks. Then off again. And the Winterbottoms complained a second time—said their light bill was way out of line and it must be due to the refrigerator's running constantly—and the landlord called up the dealer and another repair man arrived. He eventually it started misbehaving.

It worked for a month or so. But eventually it started mis-behaving.

The next representative was the dealer himself. He visited the Winterbottoms one evening. Looked at the motor, quieted it down somewhat and left some more instructions: "Don't bother about Stop 4, set it higher. And keep it there. This machine's okay."

But only for two weeks. First clue the Winterbottoms had that anything was wrong was when the motor sputtered and rumbled when it started. So another complaint was in order. The motor had to be over-hauled.

"And so I suppose it's running all right," Electra said. "But just you remember one thing: When the Winterbottoms move into their own house and buy a refrigerator, it's going to be a gas refrigerator. And when their present landlord remodels or buys a new apartment house, he's going to buy a gas refrigerator. Wouldn't you?"

"Of course not," I said. But to the lay mind, I suppose there's something in the idea.

154,000 volts—on its way to beat an egg!

THERE it goes! A cataract of power on its way to village, city and farm, frequently from a source hundreds of miles away.

Soon it will be "stepped down" to do a thousand and one jobs, from welding together a streamlined train, to beating an egg for Johnny's custard...and for pennies, too! For since 1920 the average cost of electricity for household use has dropped from 7½¢ to 4⅓¢ per kilowatt hour. From the day Corning blew a thin glass bubble for Edison's first incandescent lamp, Corning has played a useful part in the advance of electric service.

Today, because of their high electrical values and greater mechanical strength, Pyrex power insulators are used in high voltage transmission lines. "Pyrex" brand glass in lightning arresters guards against current interruptions. It is even used in the fuses that protect wiring against "overload".

Corning knows glass, for glass is Corning's only business. Glass objects of art, handmade by Steuben craftsmen, examples of which are in the Metropolitan Museum of Art. Glass for the world's largest telescope mirror. Glass in the form of miles of sturdy crystal pipelines for food and chemical industries. Glass as Pyrex Ovenware and Flameware, and in slender, cottony fibres for fireproof house insulation! Glass research in America began at Corning. Write for free copy of "Corning Glass Works presents..." Corning Glass Works, Corning, N. Y.

CORNING
means
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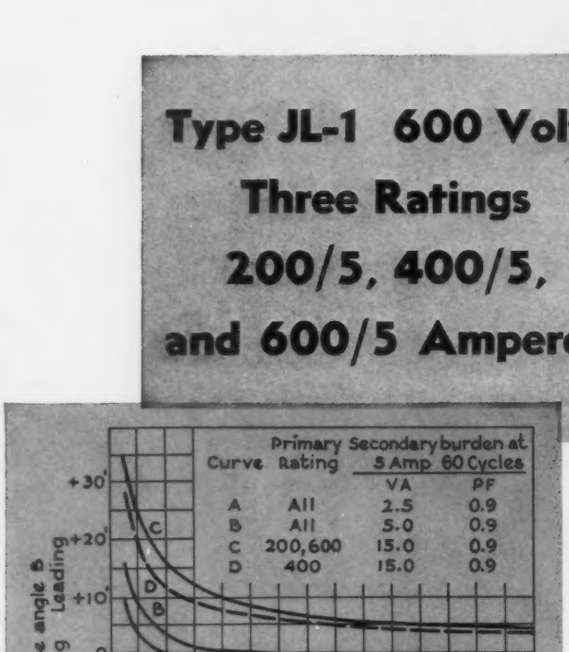
THESE NEW G-E METERING TRANSFORMERS

OFFER ADVANTAGES OF WIDE RANGE, ACCURACY, SIMPLIFIED STOCKING

Type JL-1 600 Volts
Three Ratings
200/5, 400/5,
and 600/5 Amperes

SMALL SIZE
HANDY SECONDARY TERMINALS
SILVER-PLATED CONTACT SURFACES



Ratio and phase-angle characteristics up to 150 per cent of primary-current rating.
Notice the outstanding accuracy of Type JL-1—particularly at the lower values of primary current. Such accuracy is obtained by means of the Wilson Compensation scheme—an exclusive G-E feature

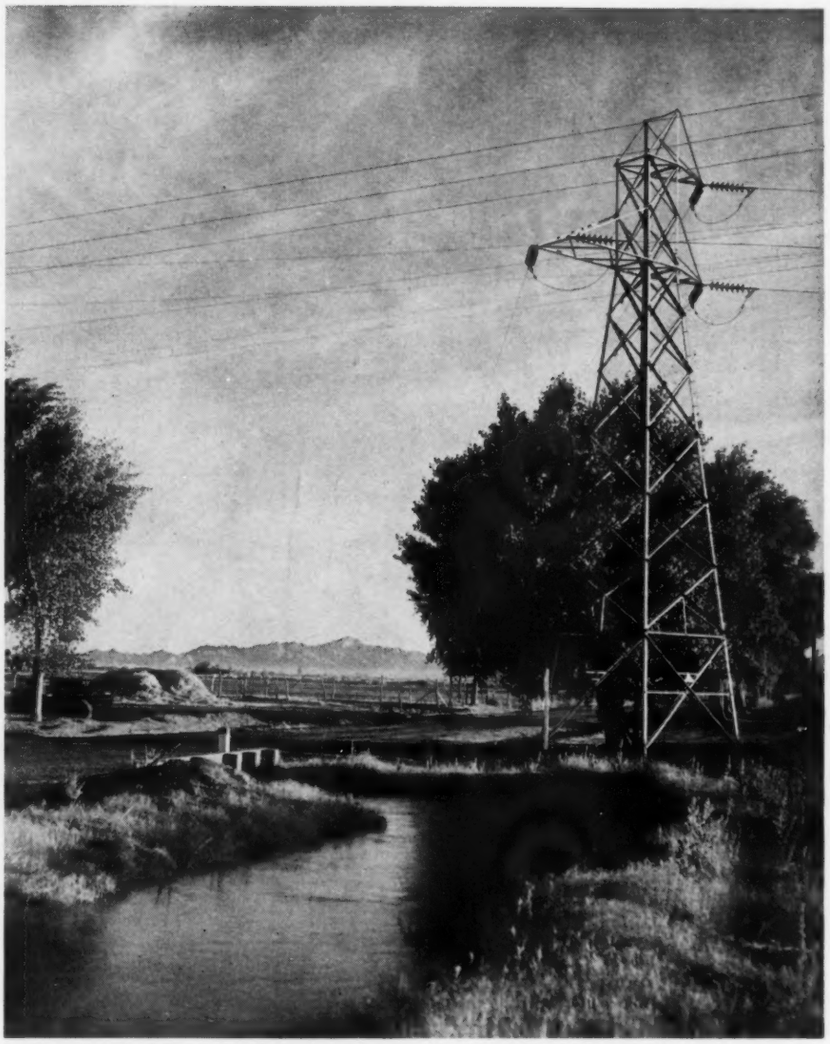
WITH General Electric's new Type JL-1, you get a line of metering transformers designed to operate continuously at 150 per cent of their rated current—200, 400, and 600 amperes.

You get current transformers that provide maximum accuracy from 5 per cent to 150 per cent rated current. You benefit from reduced transformer stock. You profit from the ability of the JL-1 to serve a large variety of loads with few replacements.

This new, small-sized G-E transformer offers many advantages. Primary terminals are of the two-bolt-hole type, silver-plated to assure clean, noncorrodible contact surfaces. Solderless, clamp-type secondary terminals are provided, and a handy potential connector, on one terminal pad, eliminates the need for cutting into heavy cable. A detachable mounting plate makes it possible to minimize installation space—permits mounting on flat surfaces or pipe.

For a complete description of the new Type JL-1, call the nearest G-E office or write for Bulletin GEA-3095. General Electric Company, Schenectady, N. Y.

GENERAL ELECTRIC



Nevada-California Electric power line crosses an irrigation ditch

What's Ahead in Electrical Farming

By H. B. WALKER

ONE sometimes indulges in retrospection to obtain mental perspective. This seems to be a good way to get a glimpse of the future of rural electrification. In the last 12 years farm electrification has increased 500%; yet for the nation as a whole, 80% of our farms are still unserved.

This in itself constitutes a challenge to the electrical industry. It is interesting to note, however, that, due in part to research in electrical applications on the farm and due in part to liberal programs of federal financing, the rate of increase in rural electrification when measured in terms of farms served is growing.

Twelve years ago approximately a quarter million of our farms enjoyed central-station service. Today a million and a quarter farmsteads are beneficiaries. With this rapid growth, a new attitude toward farm electrification is evident. Today a positive, aggressive approach has taken the place of the cautious, timid attitude so prevalent 15 years ago. The foresight of a few leaders in the electrical industry who appreciated the value and importance of objectively planned research programs and who were willing to support investigations in our Land Grant Experiment Stations through research grants did much to overcome the numerous uncertainties surrounding the extension of transmission lines into our sparsely settled rural areas.

In this, as in many other things, the Western states have made a most creditable showing. Nearly 50% of all farms in the eleven Western states have service as compared to less than 20% for the nation. This rapid expansion has been influenced by the wide-spread opportunities for electrical applications to irrigation pumping which have encouraged the building of transmission lines into rural districts where, without irrigation, service would be questionable. Moreover, irrigation pumping has had a favorable influence on rural rate structures.

In some of our Pacific Coast states farm-service connections are approaching saturation, but this does not mean the saturation point has been reached in energy utilization. In fact, each year reveals new ways to use to advantage this versatile energy which brings to rural consumers over a single transmission line power, heat and light. Once the farm connections are made the final, most important and, may I say, the most interesting task is one of load-building.

To those of us who are fortunate enough to live in the far West load-building becomes increasingly important, because already we have tapped great numbers of our farms with central-station service. Perhaps a few general examples of the use of electric energy for power, heat and light will serve to expand our horizons as we look to the future.

The magic of electric power still holds great promise for farm families, not only for use in the home, but also for numerous farm-production and processing tasks which may be done more conveniently, better and with less worry if electric energy is used. For many years electric motors have been used extensively for lifting our underground water supplies to the surface for delivery to crops by gravity through ditches and pipe-lines. Recently, however, we have witnessed a growing tendency to deliver this water under

pressure through specially designed nozzles which distribute a water spray over the crops. Pasture crops, orchards, sugar beets and vegetables are now watered in this way with rather amazing frequency, even though many have been doubtful if the practice could be profitable. To use more power for water delivery by sprinkling saves expensive land leveling, costly ditch maintenance and other tasks. Practical farmers apparently are finding these savings offset the added cost of energy required to produce the higher delivery pressures.

This system of irrigation is meeting with favor in semi-arid areas where summer pastures and forage crops, which without water might become relatively unprofitable, need freshening. The irrigation load, therefore, may become a further outlet for electric energy. True enough, irrigation pumping is dependent upon water resources; but where energy is used as a means of distribution of water to crops, as with sprinkling, this represents an added load more or less independent of the supply. The development of irrigation by sprinkling holds many attractions both for the farmer and the utility.

THE growing, marketing and utilization of crops is always accompanied by more or less processing. This processing may be on the farm or at central collecting points. The processing in any case must be economical in terms of net profit to the grower. In the West, quality of product is a primary requirement. The dehydration of fruits, nuts, vegetables and field crops such as hay, rice, Egyptian corn and cotton in the future may have a far greater place in farm operations than at present. It is true heat requirements may be such as to put electricity on a keen competitive basis with other forms of energy; but even with highly competitive heat sources power requirements remain, and the fine control and regulation possible with electric energy leave this field of application peculiarly suited to electric power, if not to electric heat as well.

The farm processing of feeds for utilization by farm flocks and herds has in no respect been explored to its ultimate possibilities. The grinding, rolling, chopping, shredding and mixing of feeds on the farm from home-grown quality products have a much more important place in our family farm agriculture than is evident in present practice. This remains an attractive field for electric power applications.

No one yet can predict the degree to which the farms of the future will be mechanized. Here in the West great strides have been made in eliminating labor, in speeding up time-consuming processes and tasks on the farm. Yet only the surface has been scratched. Electric power can and will play an increasingly important role in raising the efficiency of agriculture. The same benefits electric power has given to industry can be applied to farming. The development of the processes and applications by which this may be done represent not only a tax on the ingenuity of the farmer but a distinct challenge to the electrical industry.

ELECTRIC heat has found many unique and profitable applications in agriculture. Not so many years ago the electric incubator with its heating elements, the air-circulating fan, egg-turning equipment, humidifiers and other convenient devices took most of the risks out of artificial incubation methods. This was followed by electric brooders, not only for chicks but for pigs as well. The soil-heating cable has been not only successful for germinating seeds and stimulating the growth of cuttings but it has also found a place in hydroponics, that intriguing water-culture method of growing crops which may some day develop into electrical consumption potentialities. The heating of water on the market-milk dairy farm is an established requirement for sanitary production. To do this electrically is the ambition of every alert rural-service man. The low-wattage, high load-factor steam accumulator floating on the service line seems to be the answer. On the Grade A dairy farm the possibilities of doubling the kilowatt consumption per cow depends largely upon a heating device of this character.

THE electric fan in the evaporative cooler may readily modify environments which will have practical applications for cooling eggs, or even poultry houses and cow barns. These applications are now being used experimentally with some promise. Who can predict our limitations in this direction?

Air-conditioned greenhouses, with some control of light quality and intensity as well as temperature, humidity, air movement and purity, may show the way toward the development of plants having significant nutritional characteristics of value to both the sick and the well. Similar methods, when properly used in the production of flowers, may bring for our enjoyment plants of rare beauty, fragrance and lasting qualities.

Light is often taken for granted, yet with electricity it is possible to produce light of varying intensities and qualities. It has taken years of research and experimentation plus thousands of dollars to find a light of the right quality and intensity to become a dependable attractant to just a few of our insect pests; yet with this accomplished, who can evaluate the full economic significance of this discovery? Should it be possible to use lights for the protection of certain of our fruit and vegetable crops, which now must be protected by toxic chemicals requiring careful application for crop protection and subsequent removal for safe consumption, a great service will have been rendered to agriculture through electrical application. And, of course, the electrical industry will have added new load.

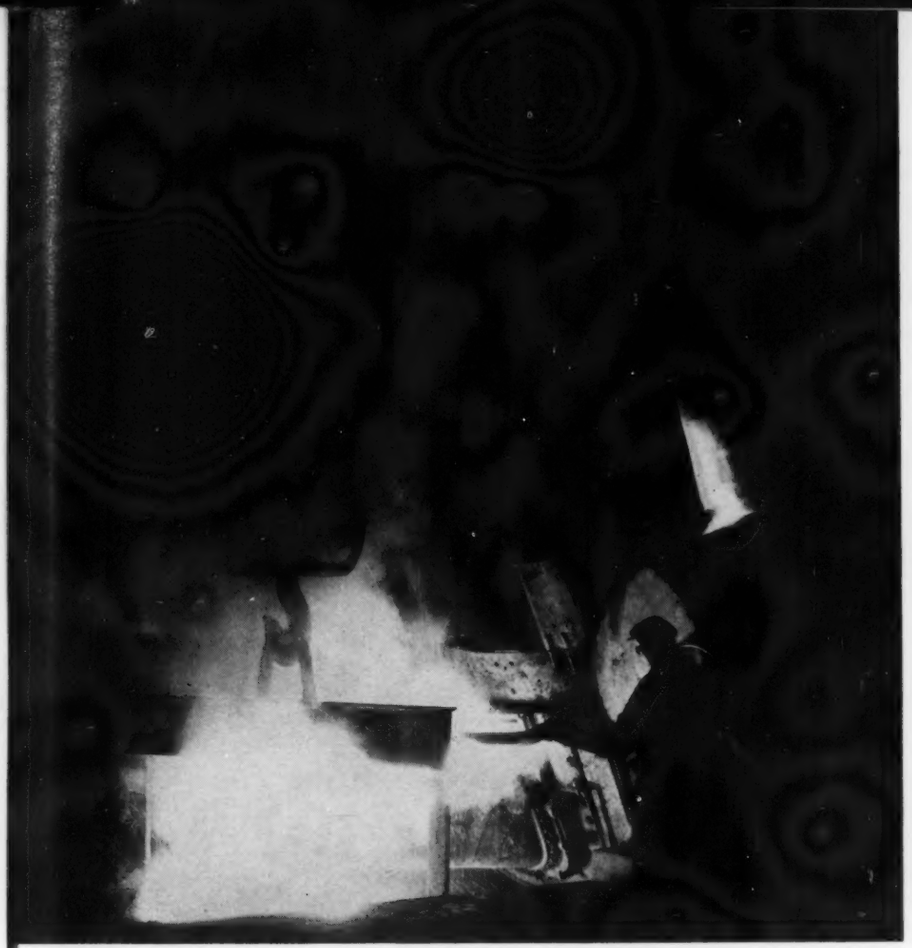
THESE various examples have been cited to show the promise of electrical applications when we think more or less singly of electricity in one of its uses as power, heat and light. Some one has listed more than 200 uses of electricity in agriculture. This includes the uses in the farm home, in farm production and in farm processing. But even with all these applications we have not exhausted, or in many cases even explored, the possibilities of use combinations; that is, power in all its applications with automatic controls for exact time intervals of operations, variable speeds, unit sizes, etc.; heat for intensity control, humidity control and air movement; light intensity, light quality, photo-electric applications and all the other things which go together with electric energy in the form of power, heat and light.

Who is willing to say we cannot pasteurize fruit juices electrically, or even pick olives electrically, or attract weevil from stored grain, or stimulate plant growth, or kill weeds and other pests, or pick chickens or sort fruit, or do dozens of other things peculiar to agriculture? We do kill insects, we do sterilize, we do sort fruit, we do pasteurize milk and we do many other tasks electrically.

Twenty years ago we might justify considerable pessimism about the practical applications of electricity to agriculture. Today it is somewhat different. Research has extended the boundaries of our thinking and with this, a growing appreciation of the usefulness of farm electrification. New uses and applications will be found, but these may not come as easily as in the past. They can be found, however, by competent men through more research—pure, applied and practical—coupled with courage, imagination, sound judgment, common sense and industry.

Industry Looks Westward

By George W. Malone



Six-ton Lectromelt furnace tapping steel into ladle

INDUSTRY is in a state of flux because of the changing economic relation between the dominant "plant factors" of transportation, power, labor and population trends.

The West does not suffer through a coordination of these changing factors. The trend of power costs has been distinctly downward in this area through a combination of pipe-line distribution of low-cost fuels and development of a large amount of hydroelectric power as a by-product of the water-conservation and flood-control programs. Year-round labor is more efficient because of climatic conditions; the center of population has moved westward, and the domestic markets have materially increased.

The recent period of unrest is forcing a realignment of industry in accordance with such economic changes, and therein lies the West's opportunity.

New industries represent new payrolls. New payrolls mean new and increasing markets, new homes, new business, new commerce. A cycle of development begins which spells prosperity for all industry, the worker and his family, the small business man who depends upon the payrolls of his locality and the farmer who sells more produce. New taxable property is created and placed on the tax rolls.

It is no idle dream. Industry is the life-blood of our civilization from which springs the strength and vitality of our country and the security of its people. Consequently, it becomes our duty to encourage actively the entrance of new productive capacity in our localities; to stimulate the utilization of our raw materials; to provide for our workers a permanent means of converting their energies into terms of comfort, health, self-respect and happiness for themselves and families.

It is a long-time program of far-seeing men and women to build our communities, our region and our country on a solid foundation of industry, and to this end the directors and staff of Industrial West have dedicated their energies for the past year. Soon we will publish a report of our studies, which have included a survey of the mineral deposits of the West and an inventory of the forest resources, of the agricultural situation and of the transportation facilities. Finally we are pointing out the electric power plants; the fuels coal, oil and gas; water resources, and the industrial areas in the West.

We have discussed a large number of present and new applications of electric power in industry, and have studied several prominent possibilities, some of which are listed below. So many industrial prospects exist it would not be possible to discuss them here, but it is well to bear in mind the principle that where one basic industrial development begins, many secondary industries cluster about to supply it with materials and supplies, or to use its products in manufacturing. It is therefore the part of wisdom to encourage the following basic developments with every possible means at our disposal.

(1) Manganese is one of the critical metals, without which our steel industry would find itself badly crippled. Used as a deoxidizer for steel in both the open-hearth and Bessemer processes, it is indispensable for the production of sound steel. We obtain our supply of ferrograde manganese ore from Russia and Brazil and smelt it to a ferroalloy in the blast furnace for the steel mills. Yet the U. S. has large reserves of manganese, nearly all of low grade and unsuitable for ferroalloy production. This problem of manganese supply is a serious one from the viewpoint of National Defense, and considerable effort has been made to work out suitable processes for treating our low-grade ores.

ONE method that promises success involves hydrometallurgical methods with an ammonium sulphate leach and electrolytic deposition. Laboratory results have been satisfactory, and the process is now at the pilot plant stage. When the difficulties of continuous operation on a small scale have been surmounted, there is little doubt that commercial plants will be built in the West near the sources of low-cost power.

(2) Chromium is a necessary element for the production of a tough steel, as well as one of the principal alloying constituents of the unstainable group of rustless irons and stainless steels. It is another one of the strategic metals, the ore supply of which is obtained chiefly from foreign sources. Yet, here again we have important reserves

of chromite in the U. S. California, Oregon, Montana and Wyoming have reserves of low-grade ore, much of which is unsuited to the present ferrochrome process and must lie idle unless new processes are worked out for their recovery. A start has already been made in this direction that gives some promise of success. This, as with manganese, involves hydrometallurgical methods, with sodium chromate solutions, a chromic acid electrolyte and electrolytic deposition of chromium metal. This process, requiring more expensive solvent than the sulphate process for manganese, and a higher power consumption, will naturally involve a higher metal cost, though present estimates indicate that it may be brought down to a reasonable figure. This is a development that should be encouraged because of its bearing on the utilization of our low-grade Western chrome resources.

(3) The Western states now have three electrolytic zinc and cadmium plants treating zinc concentrates from the complex lead-zinc ores of the West. Electrolysis is the only satisfactory method of handling such concentrates, inasmuch as they nearly always carry appreciable values in gold, silver and lead which can be recovered as a by-product; and cadmium, which is a problem in the retort method, is very simply recovered from the purification residue of the electrolytic zinc plant.

THERE is some promise of new zinc plant capacity in the vicinity of Boulder Dam to treat the zinc ores of that district, and studies indicate that new capacity is possible on the Columbia River in the Northwest. The present low price of zinc, however, means that steps to carry out plans for new capacity will be postponed, at least until the up-trend in metal prices is definite.

(4) Our supply of magnesium metal is obtained entirely as a by-product of brine electrolysis, although the West has considerable tonnage of magnesite, chiefly in eastern Washington and in California. The problem here is the development of a suitable process which could be applied to magnesite at a low enough cost to make it economical. Some attention has been given this problem, and an electrothermal method has been worked out in the laboratory that is believed to have definite promise of commercial success.

(5) The importance of power in aluminum production has stimulated the ambitions of those who see the tremendous power possibilities of the West to advocate the establishment of aluminum production capacity here. It is a worthy ambition in view of the steadily growing importance of this metal in our industrial picture. Yet there are many things to consider, of which power is only one.

With respect to power, it is necessary to have a rate not over 2 mills for firm power, with a contract over a period of 30 to 40 years, to make the West attractive to a group who would be asked to put 20 to 40 million dollars in a plant. This is a prime consideration which is preliminary to any other factors.

The West has plenty of aluminous material as alunite, leucite and clays, none of which is used as a source of aluminum. We have no bauxite in the West to supply a plant, but in this we are not unique. A large proportion of the bauxite used by the East St. Louis plant of the Aluminum Co. of America is imported from Guiana, as is the supply used by the Aluminium, Ltd. at Arvida, Quebec. It would thus be no departure from the present practice to import bauxite to the Pacific Coast, purify where low-cost fuel is available and ship the alumina to a source of 1½- to 2-mill power for reduction to pig aluminum.

(6) There has been considerable discussion of the use of the electric furnace for smelting iron in the place of the blast furnace, but as yet we find no applications of this process in the U. S. This is not because of any impracticability of electric smelting; rather it is because the U. S. has in the Illinois-Ohio-Pennsylvania-West Virginia area almost inexhaustible supplies of cheaply mineable coal, and in Michigan and Minnesota a large reserve of cheaply mineable iron ore, which can be brought together along the Great Lakes shores in the Chicago-Gary, Detroit, Toledo, Cleveland, Youngstown and Pittsburgh districts at relatively low total cost.

AN opposite situation exists in Sweden and Norway. They have no coal, but plenty of low-cost power, and the electric furnace in these two countries is being applied to producing pig iron.

Now the Pacific states have abundant low-cost power, but high-cost coal, and this places them in a parallel situation with the Scandinavian countries.

(7) The Northwest is now an important wood-pulp and paper-producing region, with plants turning out bleached and unbleached sulphite, rayon grade sulphite and bleached and unbleached sulphate pulp.

The U. S. rayon industry is at present getting close to 65% of its dissolving pulp from the three rayon pulp mills of the State of Washington, and sizable quantities of California and Arizona cotton linters also go to rayon manufacturers. In addition, our information reveals that all chemicals required for rayon production are available here on the Pacific Coast. The market for rayon yarn is steadily expanding and eastern plants are increasing their capacities to handle the demand. An interesting fact to note here is that the tire manufacturers are adopting rayon cord for their tire fabrics, and the need is to supply the already sizable market of the tire industry of southern California.

THERE can be no doubt that rayon capacity should be established at some strategic point in the West, either near the market, near the chemical supply or near the pulp supply. Wherever a plant may locate, we may be assured that there will be an opportunity for the development of new chemical capacity to supply its needs.

(8) The manufacture of thousands of articles formerly made of metal now falls within the sphere of activity of the chemist, whose experiments in synthetics have supplied the world with new plastic materials. The plastics industry, as a companion industry to a rayon plant, not only has excellent commercial possibilities in the West, but it actually is now a rapidly growing Western industry buying its molding powders from eastern manufacturers, molding here and then marketing its product nationally. All the thermoplastics, cellulose acetate, cellulose nitrate, ureas and phenols, are used; but the cellulose base plastics predominate. Yet, there is no present manufacturer in the West making the molding powders.

As is true of the rayon industry, the Pacific Coast can offer the cellulose base plastics industry all the necessary raw materials and chemicals, growing markets and relatively low costs of power, fuel and labor.

With the changing economic situation in the country, and the trend of industrial development toward the Western states, it is the proper time to examine our resources and present our advantages for new plants to those who would establish themselves in our present markets and thus reap the benefits of a growing demand for their products. It is certain that those who hesitate to move into the West will ultimately find their Western markets lost to their enterprising competitors. It is just as certain that communities that fail to rise now to the opportunity presented to capitalize upon their natural advantages will find their payrolls lost to more aggressive neighbors.

How Many Appliances Can We Sell?

1939 should be a good year for electrical appliance dealers

WHAT electrical dealers and distributors want to know is this: In view of the high saturations of some appliances in various regions of the West, just how good is the remaining market? How good is the market for replacements?

National figures released by the National Electrical Manufacturers' Assn. and by *Electrical Merchandising* must be adjusted to the Western percentages in order to bring this information in better focus for Western selling.

For example, *Electrical Merchandising* credits the Pacific states—California, Oregon and Washington—with 10.35% of the total wired homes in the nation; the Mountain states—Idaho, Montana, Wyoming, Colorado, Utah, New Mexico, Nevada and Arizona—with but 2.81% of the total wired homes. Yet in the first ten months of 1938, the Pacific states sold 9.95% of all refrigerators, 10.3% of all ranges, 13.32% of all ironers, 9.44% of all washers and 7.4% of all water heaters. The Mountain states sold 2.62% of all refrigerators, 4.8% of all ranges, 3.11% of all ironers, 3.26% of all washers and 5.5% of all water heaters. These are exceptional records. And the most significant thing about them is that they were made in the face of high saturations.

Study a few specific cases: Idaho Power Co. and dealers in that territory sold 119 ranges per 1,000 customers and had a range saturation of 25%. In spite of a water-heater saturation of 15%, they sold 58 water heaters per 1,000 customers.

Seattle City Light, with a 40% range saturation and a 27% water-heater saturation, sold 34 ranges and 30 water heaters per 1,000 customers.

Sierra Pacific Power Co.'s dealers sold 61 ranges and 19 water heaters per 1,000 customers against saturations of 53% for ranges and 14.7% for water heaters.

Replacement percentages are especially meaningful in connection with these high saturations. Figures show that range replacements run from 15 to 50% in the regions where range saturation is highest. Water-heater replacements run from 1 to 20% of new sales, these percentages closely following the saturation percentages. Refrigerator replacement sales are well up on the list—from 10 to 50% of the new customers. Washers, which almost always show high saturation figures, have replacements of 25 to 70%. Radio replacements, as is to be expected, run from 25 to 90% of radio sales.

BEARING these percentages in mind, one will notice that the estimated market figures of the NEMA have a special bearing on the sales possibilities in the West in 1939. According to the NEMA, there are 19,729,150 U. S. families with incomes of over $1.070 per year. Of these families, 55% have no electric clocks, 68% have no electric percolators, 47% have no toaster and 51% have no vacuum cleaner.

In the $2,500-per-year income group, consisting of 4,220,391 families, 51% of the homes have electric ranges and 75% have electric refrigerators and washing machines. In the $5,000-or-more-per-year group—926,648 families—there have been only 15,000 room coolers sold, 289,000 water heaters and 300,000 stokers.

GIVING due weight to the income groups to which the figures apply NEMA estimates the national appliance market to be as follows (in units):

Hot plates and grills—15,900,000; clocks—10,850,000; percolators—13,416,000; irons—2,000,000; waffle irons—14,771,000; toasters—9,273,000; radios—4,000,000; vacuum cleaners—10,061,000; washers—7,083,000; ironers—2,870,000; water heaters—637,000; ranges—2,152,000; refrigerators—8,458,000; stokers—626,000; room coolers—911,000.

Tables on other pages of this issue break down many of these figures into the reasonable expectations of Western utilities for 1939 sales. In many instances it will be noted that the quotas are conservative; that they are less than actual 1938 sales. The extent to which these figures were exceeded in 1938 is a promise of the extra market possibilities this year, if the dealers and utilities show their usual energy.

With home building on the increase, the opportunities for making electrical appliances a part of the furnishings that will go into these new homes are also increased. Generally speaking, 1939 should be a good year for electrical dealers.

New Boom in Building

NINETEEN thirty-nine will be the best year the construction industry has known since 1924. That covers a lot of territory. It even includes 1938, the best year since the extreme low of '32. But figures prove the prediction.

According to the *Daily Pacific Builder*, building permits from 100 leading cities in seven Western states last year totalled $275,500,000. This was only about half of the 1924 figure, but it represents an improvement of $25,000,000 over 1937 and $40,000,000 over 1936. And especially significant, the number of permits issued last year was 154,547.

No wonder, then, that building authorities, encouraged by this steady upward trend, look for still greater activity this year in home building, low-rental housing, slum clearance, commercial and industrial building and modernization.

To the electrical industry, this activity is important. Electrical men have been accustomed to getting about 3% of the average building dollar for installation and another 3% for fixtures. In modernization, however, their share can go as high as 20%, although it is more often between 5 and 10%.

Because of the aggressive adequate wiring promotion, the percentage of the building dollar that goes to electrical men can be increased to 5%. And in small-home construction, the initial diversion to more adequate wiring can provide a future market for from $1,500 to $2,000 in appliances, lighting, heating and ventilating equipment per home. The industry, therefore, may well look with analytical eyes into the construction prospects.

Before studying last year's building figures, however, it might be a good idea to look at a percentage breakdown of the permits in order to see what type of building predominates.

Houses, houses, houses. In the country, in the suburbs, in the city. All kinds are being built; all kinds remodeled. On these pages are six built under FHA financing plans

As shown by the Oakland figures, San Francisco is not typical; but it does offer some kind of measurement. In 1938 8,061 permits were issued for a total of $23,232,331. Of these, 2,052 permits were for single-family dwellings; 185 were for two family dwellings; 22 for apartments; 23 for schools; 1,220 for non-residential alterations, and 2,626 for residential alterations.

BUT San Francisco is an extreme case. In Oakland, 9,053 permits valued at $9,114,534 were issued. A much larger proportion of these was for single-family dwellings and residential repairs.

Because Federal Housing Administration directors and construction industry leaders are unanimous in saying that 1939 prospects are better than 1938 accomplishments, a glance at 1938 building totals may be taken as a conservative guide to the volume of building which may be expected this year.

Last year, the *Daily Pacific Builder* says, Arizona's two leading cities had a building total of $4,287,755; three Idaho cities had a total of $1,613,381; Reno, $1,569,359; six Oregon cities, $9,871,030; three Utah cities, $5,839,952; nine Washington cities, $13,844,078, and 75 California cities, $238,414,268.

Another index to 1938 home-building activity is FHA's financing of homes.

Hosea M. Hantz, Wyoming state director, reports that FHA accepted 1,009 mortgages amounting to $3,320,400. Forty-three per cent of this number was for financing construction of small homes. "It is estimated from information forwarded to this office from all sections of our state that the insured loan program financed about 60% of new home construction for 1938," Hantz says. He expects a slight drop—not exceeding 10%—this year.

Robert O. Barrett, chief underwriter for FHA in Arizona, reports that as of Nov. 30, 671 mortgages amounting to $2,363,450 had been accepted. "We look forward to a big year for 1939, which in all probability will surpass the 1938 record," he states.

Comparing 1937 with 1938 figures, C. R. Jackson, Washington state director, reports a total of 2,507 loans, rep-

resenting $7,561,800, in 1937. Of these loans, 752 were for new construction. In 1938, total loans were 3,519 ($12,098,700), of which 1,317 were for new construction. The average insured loan for existing construction was $2,865; for new construction, $3,810. "We anticipate an increase of some 50 to 75% in new construction business over 1938," Jackson says.

Jamison Parker, Oregon director, reports that 1,447 of the 3,613 applications for loans approved since his office opened five years ago were approved last year. Value was $4,763,600. Early indications are that 1939 will be even better.

D. C. McGinness, northern California director, reports that total home units —new and old, up to and including four-family dwellings—qualifying for loans in 1938, were 4,343. This represents a value of $22,552,500. San Francisco alone experienced a 551% increase in new home mortgages in 1938 over 1937.

Business done by the southern California office of FHA was the largest of any FHA office in the nation. W. G. Bingham, district director, reports that last year there were 26,423 applications for loans amounting to $119,330,441. Of these applications, about 60% were for new construction.

EARL S. Anderson, manager of the construction industries department of the Los Angeles Chamber of Commerce, supplements this report with a list of major southern California construction jobs expected in 1939. He estimates (in millions of dollars) that $25 will be spent on flood control; $5 on highways and bridges; $10 on industrial and commercial buildings; $10 on FHA large-scale housing; $2 on slum clearance; $23 on PWA jobs; $13 on the Bureau of Power & Light's Boulder transmission line; $36 on storm drains, sewers, streets and buildings and $100 on residential construction. All of which means that 1939 building permits in Los Angeles County will exceed last year's total of $154,960,579 by millions of dollars.

Charles Cadman, chairman of the construction industries section of the San Francisco chamber, is equally optimistic. Replies to a personal survey he conducted indicates that in five Western cities more than 250 homes will be built this year; in ten cities more than 200 homes will be built; in another ten cities more than 100 will be built; in 16 more than 50 will be built. Thirty others said "many" will be built.

No matter how much they cost—those on opposite page were $4,800, $2,400, $10,000; above, $1,600, $3,800, $4,500—all new houses are today built to use plenty of electricity

Another phase of this building boom is equally important. Best indication of its magnitude was the insurance of a $3,000,000 loan to build 1,202 dwelling units in the Los Angeles low-rental housing project known as Wyvernwood. This project, which will feature electric ranges, refrigerators, water heaters and bathroom heaters in every apartment, will offer rentals at $8.75 per room.

Other low-rental projects in the West include the Encancto Apartments, Phoenix: 21 units, $69,000; Colorado Blvd. Apartments, Denver: 21 units, $70,000; Edgewater Park, Seattle: 304 units, $1,080,000; Argyle Village, Los Angeles: 8 units, $26,000; F. B. Layne, Los Angeles: 22 units, $26,000; Campagna, San Jose: 9 units, $22,000.

IN addition, commitments to insure six large-scale projects in California and two in Colorado have been issued.

Slum clearance is also to be reckoned with. Under the USHA, California, Colorado, Montana and Oregon have passed enabling legislation to permit state participation in these projects. In California, the first three loan contracts have been approved and work should start soon on a project in Long Beach, one in San Francisco and one in both east and west Oakland.

USHA reports the following earmarkings and loan-contract approvals so far: City of Los Angeles, $25,000,000; Los Angeles County, $2,669,000 ($2,331,000 approved); Oakland, $2,409,000 ($2,591,000 approved); San Francisco, $13,017,000 ($1,983,000 approved); Denver, $3,000,000; Pueblo, Colo., $1,000,000; Butte, $900,000; Billings, Mont., $270,000; Great Falls, Mont., $675,000; Helena, Mont., $300,000.

Although July 1, 1939 is the deadline for acceptance of mortgages under Title I, FHA (modernization loans) and for acceptance of the 25-year, 90% mortgages under Title II, construction industry groups are making strenuous efforts to have Congress extend these provisions for another year. Still remaining are the 20-year loans at a slightly higher insurance rate.

No matter what FHA, Congress or anyone else does, however, this year's building business should be active and full of opportunities for the electrical man.

Table I—Comparison of Western to National Operations for 1937 and 1938

	11 Western States		United States		Per Cent West to U. S.	
	1937	1938	1937	1938	1937	1938
Energy Generated (Thousands of kw.-hr.)	20,430,384	19,814,663*	117,791,373	111,931,628*	17.3	17.7
Energy Generated in Hydro Plants (Thousands of kw.-hr.)	17,017,301	17,721,449*	43,417,535	43,518,673*	39.2	40.7
Energy Generated in Fuel Plants (Thousands of kw.-hr.)	3,413,083	2,093,214*	74,373,838	68,412,955*	4.6	3.1
Percentage of Hydro to Total Generated	83.4	89.3	36.9	38.9		
Gross Revenue from Energy Sales (Thousands of dollars)	$286,000	$278,000	$2,180,788	$2,172,750	13.1	12.8
Installed Generator Capacity, kw.	5,803,755†	6,195,547‡	37,032,112†	38,334,644‡	15.7	16.2
Installed Hydro Capacity, kw.	3,813,907†	4,117,937‡	10,254,115†	10,693,097‡	37.2	38.8

*Twelve months ending November †F P C final report for December 31, 1937. ‡F P C preliminary report for December, 1938.

Table II—Ten-Year Generation Record for Western Public Utilities

(Thousands of Kw.-hr.)

State	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938*
Arizona	283,023	384,443	404,309	280,898	295,688	344,939	377,797	510,483	693,524	683,081
California	8,849,622	8,948,326	8,796,177	7,948,505	8,023,243	8,562,053	9,060,296	10,091,716	9,598,651	9,338,332
Colorado	563,813	573,341	528,817	478,263	459,453	506,710	549,157	652,404	682,222	688,355
Idaho	894,417	911,709	796,484	584,589	594,428	685,069	672,466	796,430	972,212	975,852
Montana	1,613,688	1,319,800	966,097	635,093	922,814	867,504	1,296,199	1,452,390	1,319,637	1,281,889
Nevada	43,840	42,895	19,006	32,749	24,231	32,152	27,719	171,499	1,152,788	1,474,253
New Mexico	67,179	75,871	179,658	157,611	157,482	173,233	190,744	214,602	254,880	259,112
Oregon	1,161,386	1,219,250	1,176,987	968,980	965,748	1,002,328	1,083,818	1,250,421	1,301,715	1,241,033
Utah	402,005	292,550	276,483	275,476	327,379	206,679	309,835	418,194	507,415	343,197
Washington	2,552,325	2,555,233	2,572,134	2,486,754	2,438,832	2,747,366	2,981,621	3,273,148	3,727,223	3,392,983
Wyoming	98,665	98,215	94,539	84,633	78,964	81,856	93,779	114,755	130,007	136,509

*F P C reports for twelve months ending November.

Table III—Type and Capacity of Utility Generators as of December, 1938

				Generator Capacity of Plants Operated by									
				One Type of Prime Mover					Combination of Two or More Types				
				Water Power		Steam Power		Internal Comb. Engines	Total		Water Power	Steam Power	Int. Comb. Engines
State	†Companies	*Plants	Total Capacity Kw.	No.	Kw.	No.	Kw.	No.	Kw.	No.	Kw.	Kw.	Kw.	Kw.
Arizona	21	45	244,812	12	127,050	8	77,810	20	15,615	5	24,337	0	7,407	16,930
California	30	153	2,798,098	116	1,603,539	26	1,066,322	9	36,452	2	1,785	900	0	885
Colorado	34	72	281,120	21	63,015	31	207,398	14	8,056	6	2,651	1,285	300	1,066
Idaho	16	47	258,432	39	253,890	2	600	3	1,612	3	2,330	1,660	0	670
Montana	12	32	332,396	18	321,320	5	6,765	6	1,679	3	2,632	180	1,476	976
Nevada	7	12	508,769	7	503,350	0	0	3	2,063	2	3,356	400	2,500	456
New Mexico	18	38	101,914	1	80	12	83,089	22	13,955	3	4,790	834	1,430	2,526
Oregon	27	70	445,409	44	259,901	17	177,300	5	2,238	4	5,970	2,030	500	3,440
Utah	22	60	159,890	46	88,387	2	59,750	5	2,800	7	8,953	3,390	0	5,563
Washington	30	71	1,013,256	48	792,823	14	215,370	4	1,094	5	3,969	2,145	880	944
Wyoming	22	37	51,451	7	14,582	17	31,134	9	3,821	4	1,914	1,250	372	292
11 Western States	239	637	6,195,547	359	4,117,937	134	1,925,538	100	89,385	44	62,687	14,074	14,865	33,748
United States	1,720	3,854	38,334,644	1,401	10,693,097	1,217	26,212,279	1,001	616,612	235	812,656	221,699	479,978	110,979

†Only generating companies and municipalities. Duplications appear for interstate operations.

*All plants generating 10,000 kw.-hr. or more per month for public use. Preliminary F P C reports.

Table IV—Customers Grouped by Type of Consumption for 1937 and 1938

	Agricultural Customers		Domestic Customers		Commercial Lighting and Small Power		Wholesale Power and Miscellaneous		Total Customers	
State	1937	1938*	1937	1938*	1937	1938*	1937	1938*†	1937	1938*
Arizona	6,890	7,200	59,011	72,000	12,333	13,400	764	1,301	78,998	93,901
California	117,354	120,000	1,649,425	1,640,200	307,787	303,100	31,048	48,973	2,105,614	2,112,273
Colorado	9,625	12,200	176,194	186,700	29,397	31,100	8,701	10,560	223,917	240,560
Idaho	20,109	22,400	67,537	70,400	14,177	13,400	504	1,733	102,327	107,933
Montana	4,582	5,000	82,540	80,200	17,216	15,200	742	2,082	105,080	102,482
Nevada	1,276	1,300	17,680	18,600	4,553	4,400	204	460	23,713	24,760
New Mexico	2,100	2,300	33,146	34,500	9,137	9,300	717	613	45,100	46,713
Oregon	29,016	33,900	205,925	206,900	38,583	43,700	4,049	3,178	277,573	287,678
Utah	19,369	19,100	88,986	93,100	12,681	13,400	2,291	2,870	123,327	128,470
Washington	47,045	52,300	362,453	371,300	59,134	63,300	3,146	3,755	471,778	490,655
Wyoming	1,993	2,300	30,231	32,600	6,364	6,500	1,119	1,400	39,707	42,400
11 Western States	259,359	278,000	2,773,128	2,806,100	511,362	516,800	53,285	76,925	3,597,134	3,677,825
United States	1,241,505	1,410,000	21,697,515	22,010,000	3,891,584	3,972,000	333,383	373,480	27,163,987	27,765,480

*Estimate based on first ten months. †1938 includes other public authorities.

HERE IS *Your* LIVELIHOOD

STATISTICS SHOW IT'S SOUND

TO you, an electrical worker in the West, these data spell security. Regard these tables not as a collection of numbers, but as measurements of the basic variables which determine your income and indicate your future.

Viewed in this way, the West is a satisfying picture. In comparison to the nation, the electrical industry in the West is faster-growing and is rendering a more complete but more inexpensive service. That means that Westerners have a keener appreciation of electric value than has the average citizen of the United States.

That in turn guarantees that more electric service will be demanded as time goes on. To you, that means work to be done—opportunity.

A Resilient Business

Remember 1937? That was the year when most Western systems reached all-time peaks. The year when industry at large was pulling rapidly out of the depression. Last year was not so good.

But notice how small was the effect of this decline upon the electrical industry in the West. This is clearly demonstrated in Fig. 1, which pictures three important measures of the industry's performance and compares the West to the nation.

Briefly, it shows that in 1938 the West increased its generating capacity by twice the percentage of the nation as a whole. Similarly it shows that Western consumption fell off by but half the national percentage. And it shows that consumption per capita was almost twice the national average.

Incidentally, such ratios are not peculiar to 1938. Similar comparisons are true for the year before, except that in 1937 consumption showed an increase over 1936, with the Western percentage twice the national figure.

Fig. 1 is derived from the data in Table I, which can most easily be visualized in column three, where the percentages of West to U. S. appear. The figures are taken from corresponding Federal Power Commission reports for the two years. The 1938 figures are from preliminary reports where so indicated, and a check of final to preliminary figures for previous years indicates the preliminary figures to be almost always accurate to within 2 or 3%.

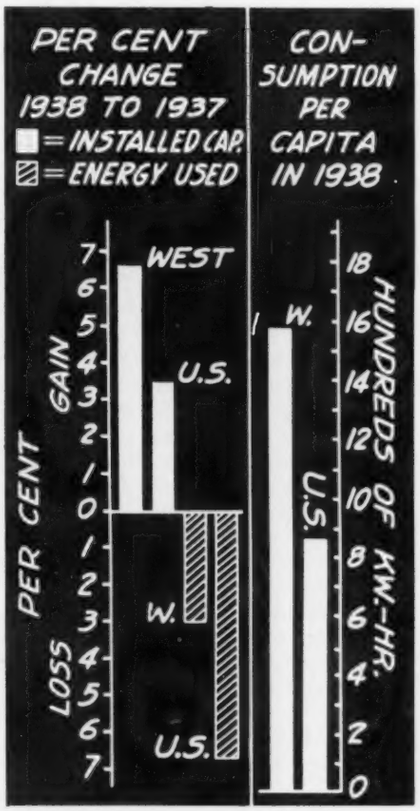


Fig. 1

More exactly, the comparisons shown in Fig. 1 are: capacity gain, 1938 over 1937, 6.7% for the 11 Western states, 3.5% for the nation; energy decline, 3.0% in the West, 6.7% (*sic*) for the U. S.; consumption per capita (1938), 1,581 kw.-hr. in the West, 864 kw.-hr. for the U. S.

Table I, column 3 shows the West again accounting for a larger percentage of all generated energy than it did in the preceding year. The decline in steam percentage (third line) is the logical result of a decline in gross generation for a region where the bulk of energy originates in base-load hydro plants. In other words, steam accounts for only a small percentage of the total Western generation, is, furthermore, employed to carry the peaks. Hence a decline in total generation affects the Western steam-output figure appreciably.

A strong influence on last year's decline in Western output was the loss of large mining loads in the Mountain region. It is significant that many large systems elsewhere in the West showed output as great as for the preceding year. Note in Table II that Colorado, Idaho, New Mexico and Wyoming show increase.

A Growing Service

Again in Table I, a small reduction appears in the percentage of Western to national gross revenue. While the 1938 revenue figures are approximations (in fact some large systems enjoyed larger revenue in 1938), it is to be recalled that rate reductions were numerous throughout the year. The figure may, therefore, indicate that the West offers further savings in its already lowest-cost service.

Table III identifies the enlarged generating facilities in service as this year began. Table IV classifies the customers this equipment must serve and shows how many more of them there were last year than in 1937.

What lies ahead? If the expansion programs (page 40), as reported by the chief engineers of the Western systems are a measure, the answer is a bigger schedule of building to meet bigger demands. Such confidence appears justified by the consistent growth that has been recorded in the West for so many years.

As the first statistics of 1939 performance were reported, further reason for confidence appeared. Edison Electric Institute reported energy output for the first week in January running 1.4% over the first week in 1938.

BUDGET for 1939

FOR some weeks now, the grapevine has been rustling with the rumor that 1939 is going to be an active year. But there's been some question as to what this would mean in terms of electrical construction in the West. Here's the answer: a 36.4% increase over 1938 in expansion and improvement of facilities.

Thirty-one private and municipal systems have reported their budget figures for such work in 1939. They total $80,865,000.

The components of this total can be traced to their source in the following reports. Note, however, that it does not include expenditures on reclamation projects, Bonneville, or the REA. It is the total for the 31 systems only.

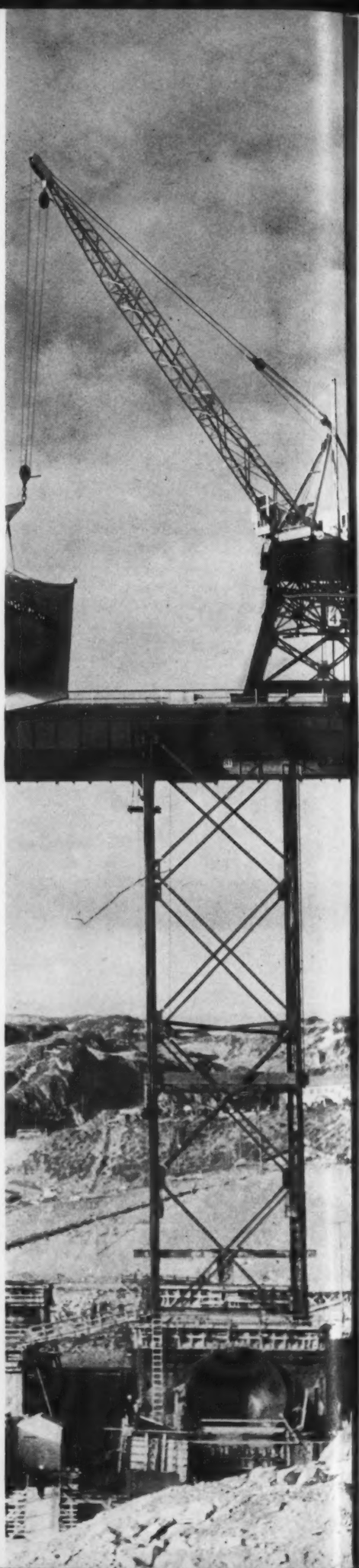
Last year, report these groups, $57,693,000 was actually spent for the same type of work. How accurate is the forecast for 1939?

When budgets were set up a year ago this time, the 1938 total was $75,433,000, with $3,222,000 of that figure held in abeyance, pending a turn in general business. Business took a turn for the worse. On top of that, an unanticipated delay postponed construction of the Los Angeles Bureau's third circuit to Boulder Dam, then figured at $11,000,000.

If these two figures are deducted, the forecast of a year ago departs by 6.2% from the actual 1938 expenditure as reported now. Thus, if a decrease in business caused programs to be curtailed, it is logical to expect that better business this year may cause programs to be enlarged.

To estimate the full scope of electrical activity in the 11 Western states, one must add to the systems total those expenditures which will be forthcoming from Bonneville, the Reclamation Bureau and the REA.

At Bonneville, the initial transmission program involves some $14,000,000, a large part of which is to be spent this year. Before other Western federal projects reach the point of initial development, an amount probably between 300 and 500 million will have to be spent, while 285 million more will be needed to carry them to ultimate capacity. Speculations as to the forth-



coming REA appropriations can be little more than such, but last year the allotments to the West totalled $4,466,000.

Considering the general nature of recent and forthcoming work, distribution modernization is found to play a very important role.

Hydro installations, generally speaking, are those of federal government, while the systems are improving reliability by installing steam. Last year, P. G. & E. added 50,000 kw., while smaller additions were registered in Arizona, Colorado, New Mexico and Oregon. This year's major additions will be P. G. & E.'s 50,000-kw. oil-refinery unit, and a new 20,000-kw. plant for the City of Glendale.

The distribution work involves considerable breaker modernization and improvements in regulation. Those systems which undertook capacitor installations last year contemplate less of this work for 1939, but other systems are installing capacitors for the first time.

Following are the individual reports, alphabetically arranged.

Albuquerque G. & E.

In round numbers, $225,000 is budgeted for new and improved facilities this year, as compared with $150.000 in 1938. Construction activities will include the addition of a 2,500-kva. turbogenerator at our Bernalillo plant. Last year, generating capacity was increased 6,250 kva. by addition of a steam turbine.

No additions were made last year to transmission facilities, but some 10 mi. of distribution were added. New transformer capacity totalled 4,500 kva., and 450 kva. in capacitors were installed.—*A. F. Prager, vice-president and general manager.*

Arizona Edison

A comparison of 1938 construction expense, estimated from 11 months, with the tentative figure in the 1939 budget for similar work, indicates that this year will be an active one—$213,000 as compared with $131,000 for 1938.

Capacity will be increased with the addition of a 1,360-kw., diesel-driven generator. A slightly larger unit was added last year. Transmission improvements are minor.

The distribution figure will be about doubled and may reach $60,000. Major portion of last year's expense was for line extensions. Some nine miles are expected to be added, as against 11 mi. last year.—*D. B. McGregor, treasurer.*

Arizona Power

New and improved facilities will represent about the same expenditures in 1939 as in 1938, namely $110,000. No increases in generating capacity appear for either year, the programs involving the following activities.

Transmission

No new lines were built, but impulse insulation value was increased on the 44-kv., 33-mi. Mingus line by installing wooden cross arms on the steel-tower section and by installing wooden braces and wood guy strain insulators on the wooden-pole section. The original insulators, installed in 1908, were replaced. A 6-mi. section of the Verde line, a 44-kv. tie between hydro and steam plants, was rebuilt. An additional 9 mi. of this line is to be rebuilt this year. No new lines are contemplated.

Substations and Distribution

Ten miles of line were added in 1938, but no major improvements are scheduled for the year to come. Last year, a 44-kv. outdoor steel substation at Tapco steam plant replaced an obsolete indoor unit, new capacity amounted to 400 kva., voltage regulators were added at two distribution points. This year we propose to modernize Childs substation.—*Malcolm M. Bridgewater, general superintendent.*

Bonneville Project

Last year, the first two units at Bonneville powerhouse, each rated at 43,200 kw., 0.9 power factor, were completed. The third and fourth units, each rated 54,000 kw., same power factor, have been authorized by Congress and purchased by the War Department.

The magnitude of the transmission line construction program may be judged from the following data:

1. Bonneville to Vancouver, 220 kv., double circuit, on steel towers, 36 mi.
2. Vancouver to Kelso, 220 kv., single circuit, on steel towers, 40 mi.
3. Bonneville to Grand Coulee, 220 kv., single circuit, on steel towers, 240 mi.
4. Kelso to Raymond, 110 kv., single circuit, on wooden H frames, 90 mi.
5. Vancouver, Washington to Oregon City, Oregon, 110 kv., double circuit, on single circuit wooden H frame towers, 30 mi.
6. Oregon City to Eugene, 110 kv., single circuit, on wooden H frame towers, 100 mi.
7. Bonneville to The Dalles, Oregon, 110 kv., single circuit, on wooden H frame towers, 45 mi.

Thirteen substations and a switching station have been authorized under the present appropriations. These will be designated and located approximately as follows: North Vancouver (near Vancouver, Washington), Midway (approximately half way between Bonneville and Grand Coulee and about 30 miles southeast of Yakima, Washington), St. Johns (in northwest Portland, Oregon), Kelso and Raymond (in or near Kelso and Raymond, Washington, respectively), Hood River, The Dalles, Oregon City, Salem, Albany and Eugene (located in or near the towns in Oregon for which the substations have been named), North Bank (just north of the Bonneville Dam in Washington), South Bank (just south of the Bonneville Plant in Oregon) and a 220 kv. Switching Station, North Bonneville, near the Bonneville Power House.

Designs, surveying and construction of the lines and substations of the Projects were materially advanced by the end of 1938. Tentative designs for all substations have been completed. Preliminary survey has been completed on practically all lines, and tower locations have been staked on about one-fourth of the right-of-way.

Most of the transmission line conductor, insulators and towers have been

Current and Future Power Development on Western Reclamation Projects

Name of project	State	River	Purpose	Name of power plant	Year initial operation	Initial capacity kw.	Initial capacity No. of units	Ultimate capacity kw.	Ultimate capacity No. of units
Boulder Canyon	Arizona-Nevada	Colorado	F. C., Irr., P.	Boulder	1936	539,800 (2)	9 (3)	1,322,300	19 (4)
Columbia Basin	Washington	Columbia	F. C., Irr., P.	Grand Coulee	1941	344,000	5 (5)	1,974,000	21 (6)
Central Valley	California	Sacramento	F. C., Irr., P.	Shasta	1942	300,000	4 (7)	375,000	5 (8)
Kendrick	Wyoming	Platte	F. C., Irr., P.	Seminoe	1939	32,400	3 (9)	32,400	3 (9)
Rio Grande	New Mexico	Rio Grande	Irr., P.	Elephant Butte	1941	24,300	3 (10)	24,300	3 (10)
Colorado-Big Thompson	Colorado	Blue	Irr., P.	Green Mountain	1941	21,600	2 (11)	21,600	2 (11)
Colorado-Big Thompson	Colorado	Big Thompson	Irr., P.	1, 2, 3, 4, and 4A	(12)	(12)	(12)	105,000	(12)
Parker	Ariz.-California	Colorado	W. S., Irr., P.	Parker	(13)	(13)	(13)	120,000	4 (14)

(1) F. C.—Flood control; P—Power; Irr.—Irrigation; W. S.—Water supply.
(2) As of January 1, 1939.
(3) 6—82,500 kw.; 1—40,000 kw. and 2—2,400 kw.
(4) 15—82,500 kw; 2—40,000 kw.
(5) 3—108,000 kw.; 2—12,500 kv-a at 0.8 p. f.
(6) 18—108,000 kw.; 3—12,500 kv-a at 0.8 p. f.
(7) 4—75,000 kw.
(8) 5—75,000 kw.
(9) 3—12,000 kv-a at 0.9 p. f.
(10) 3—9,000 kv-a at 0.9 p. f.
(11) 2—12,000 kv-a at 0.9 p. f.
(12) 5 plants installed in approximately 1944 to 1965.
(13) To be installed when power requirements warrant.
(14) 4—30,000 kw.

purchased and a large percentage of conductor and insulators has been delivered. Bids have been opened for oil circuit breakers.

The present appropriations will be obligated during the fiscal year 1939, either for material or for construction contracts. The work under these contracts will be largely completed in 1940. Further development of the Project will depend largely upon appropriations made during the coming fiscal year. Plans for future development are mainly in the direction of line extensions for service in communities which will not be reached by the lines under the present appropriations.

B. C. Electric Railway

Present indications point to 1939's being rather a quiet year, so far as new construction is concerned, as the work to be undertaken by this company will be confined mainly to the completion of certain items already undertaken. Last year a 44,000-kva. hydro unit at Ruskin was put in service, doubling capacity of the plant. This entailed a new bank of three 14,667-kva. transformers. No transmission lines were built.

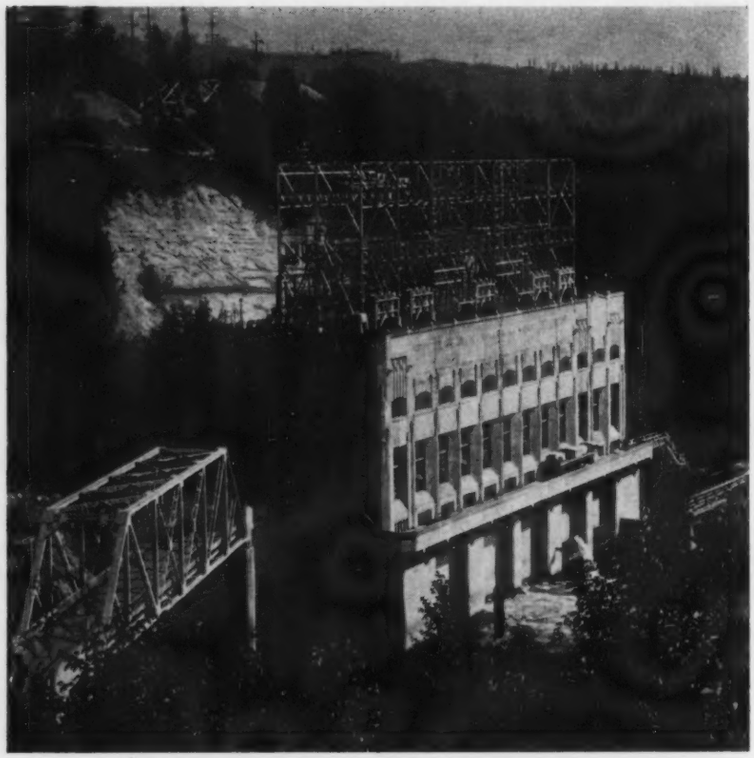
Replacement of wood poles throughout the mainland system continued on about the same scale as during the past few years, about 4,000 poles being renewed at an approximate cost of $200,000.

Grandview substation was completed, an important addition to the distribution plant in Vancouver. This involved two new 12-kv. cable circuits to Haro St. substation, and another to Main St. substation. This represents the first active section of a larger 12-kv. underground cable development to supply the central and western sections of the city.

The entire railway power primary supply at Main St. substation was changed from 34.6 to 12 kv., eliminating the higher voltage switchgear and relieving congestion.

Extensive enlargements are in progress at Burnaby substation. Major item is the installation of three 10,000-kva. transformers, through which will pass the added power from Ruskin. Additional high-voltage bus and switching equipment is involved.

Enlargement of the railway power installation at Fir St. substation may involve the installation of two new 1,000-kw. synchronous converters the first half of this year. A new station last year added 660-kw. in Hewittic type mercury-arc rectifiers. The three installations of this type, completed in recent years, have given excellent operating results.—*A. Vilstrup, chief electrical engineer.*



RUSKIN PLANT where British Columbia Electric Railway Co. last year completed installation of a second 44,000-kva. unit, thus making ready for growth in the system

Bureau of Reclamation

Current and future development of projects involving power are summarized in the table on page 41. Two other tables give supplementary information on Boulder Dam: power plant facilities, page 44; transmission facilities, page 45.

Calif. Oregon Power

An estimate based on 11 months of 1938 indicates that $800,000 was spent during the year for new and improved facilities, whereas $722,000 is budgeted for similar work in 1939. This company does not generate.

Transmission facilities were increased by 12 mi. of 66-kv. interconnection. Reconductoring took place on 47 mi. of line, the change being from No. 4 to No. 2 copper. Insulation increased the voltage on 25 mi. of line from 22 to 66 kv. An estimated 54 mi. of distribution line was added while new regulators totaled 126 kva.—*J. C. Boyle, vice-president in charge of operation.*

Central Arizona L. & P.

Only addition of any consequence during 1938 was a 16,000-kw., 165,000-lb./hr. outdoor steam boiler at our plant 4 mi. west of Phoenix. Costing about $400,000, this included an addition to the spray pond and extra circulating equipment.

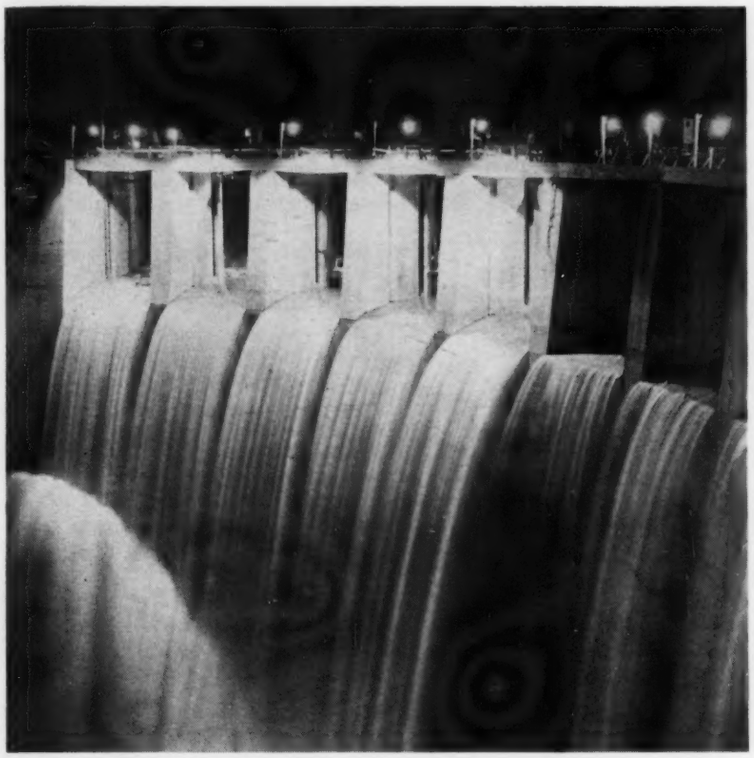
The 1939 program does not include any large construction items and calls chiefly for the usual extensions required to serve a town of this size (Phoenix). Inasmuch as the program has not yet been formally approved, it is too soon to give details.—*A. F. Morairty, vice-president.*

Coast Counties G. & E.

Our outlay for plant improvements will be slightly larger in 1939, the budget showing $280,000, as compared with $245,000 in 1938. Contributing to this will be the reinsulating and reconductoring of 13 mi. of 22-kv. transmission line, and the addition of 20 mi. of 60-kv. transmission.

It is impossible to give complete details on the 1939 program as yet. However, no new generating capacity will be installed. For distribution, some 30 mi. of line were added last year, while $60,000 was spent for rebuilding. Contemplated this year is a $75,000 expenditure for rebuilding.

Substation and equipment additions last year involved 3,500 kva. in added transformer capacity, and regulating



FRANK M. KERR PROJECT, important addition to Montana Power Co.'s system, was put on the lines in 1938. One 56,000-kw. is installed. The dam is 200 ft. in height

equipment of like capacity. Capacitor installations amounted to 360 kva. No definite capacitor installations have been contemplated so far for 1939, but 750 kva. in added transformer capacity and regulating equipment is scheduled.—*A. E. Strong, general superintendent.*

Eastern Oregon P. & L.

Anticipated is a 30% increase in system improvements for 1939 as compared to 1938, estimated expenditures for the two years being $100,000 and $71,000 respectively. No additions to either generating or transmitting facilities appear in either year. In 1939, distribution expansions will be about double those for last year, 35 as compared to 18 mi. of new lines, and 6 as compared to 4 mi. of rebuilt lines.

Last year's addition of 550 kva. in transformer capacity will be almost matched by this year's 500 kva. Regulators will amount to about 10 kva., while 200 kva. of capacitors is scheduled, though none was added last year. —*O. D. Lanning, chief engineer.*

Eugene Water Board

We plan additions totaling about $240,000 in 1939, considerably under last year's $450,000. It will be spent mostly in the 11-kv. distribution system. We plan no increased generation or transmission.

Last year we reinsulated 13 mi. of 44-kv. line to 66 kv., and raised voltage of the whole transmission system to 66 kv. Circuit-breaker capacity was increased at our central distributing substation for the 11-kv. system. At present we are working over a number of outmoded breakers so they may be mounted in outdoor 11/2.3-kv. substations, to network our 11-kv. system.

Other work last year included the addition of a 1¾-mi., 11-kv. tie line and the installation of new copper on several weak 2.3-kv. lines.

Last year was 6½% above 1937 in demand, and 9% in kw.-hr. Revenues ran about 3% above 1937, the increase being about uniform over the different classes of service.—*H. P. Currin, superintendent, electrical department.*

Grays Harbor Railway & Light

Set forth for construction work in 1939 is approximately $12,500. During 1938, we spent $38,000 for similar work. The new Canadian tariff seems to have struck our section of the country pretty hard, especially with reference to lumber products on which the reciprocity treaty sets a lower tariff than before. Slow lumber business will, of course, affect us.—*William S. Hill, general superintendent.*

Idaho Power

Comparative figures show system improvements approximated $1,275,000 in 1938 and are estimated to be $1,204,000 in 1939.

Generation

This work centers around improvements, no capacity being added. Last year, at Barber hydro station, built in 1904, we increased the rating of three generators from 300 to 438 kva. by modernizing the stators. This year's work will include a rubble rock foundation under Malad penstock and two expansion joints in the pipeline. Operators' living quarters will be extended at several outlying plants.

Transmission

To close a transmission loop and to provide two-way service to towns, 19½ mi. of 44-kv. line was added last year, while building ½ mi. of 132-kv. line made possible the conversion from 66 to 132 kv. of a section between Hagerman Valley and Caldwell. About 30 mi. of transmission was reinsulated, 44-kv. insulators being replaced with 66-kv. About 110 mi. of transmission previously operated at 66 kv. was converted to 132 kv. No major changes are contemplated this year.

Distribution

Last year's work saw 200 mi. added, 50 mi. rebuilt, and the voltage of 4 mi. raised from 4 to 11 kv. Similar additions are expected in 1939, together with the rebuilding of about 25 mi. Modernizations will be numerous but minor.

Substations and Equipment

Feeder-type voltage regulators were installed last year at ten substations, and 20,000 kva. of transformers were added. Modern feeder breakers were installed on seven 4-kv. feeders and two 11-kv. feeders. Improvements were made to relay installations at a number of points, and capacities of several instrument transformers and feeder cables were increased.

Transformer capacity amounting to 4,000 kva. is expected to be added at three points this year, and feeder-type voltage regulators are to be installed at about ten substations. Four or five substations will receive modern breakers. Minor changes will be made at a number of points in the capacity of cable and instrument transformers.

Miscellaneous

Carrier current telephone equipment was added to last year, and when completed will make possible direct communication between Boise and important points east as far as American Falls. The terminal station at Caldwell (132/66 kv.), representing 20,000 kva., has been installed. A new substation was built at Fort Hall.

This year's program includes two

substations, to be built at Buhl and Gooding. The two substations at Caldwell are expected to be combined with all equipment located at the new terminal substations site.—*H. L. Senger, chief engineer.*

Imperial Irrigation District

For 1938, cost of all additions and improvements to the District's power system approximated $2,600,000. Estimated for the same items for 1939 is $2,800,000.

General

Anticipating power possibilities on the All-American Canal, the District began construction of its power system in 1936, with a diesel plant and local distribution at Brawley. The diesel plant is being enlarged to serve the system until All-American power is available.

Generation

A 4,500-kw. diesel unit was added to Brawley in 1938, and contracts have been awarded for a 5,000-kw. unit to go in this year. Two hydro plants will be constructed this year on the All-American Canal, at Drop 3 and Drop 4, capacities being 4,800 and 9,600 kw., respectively.

Transmission

First of this system's transmission was built last year, 124 mi. of 33-kv. lines, connecting the Brawley plant and Drop 4 with the cities and towns of Imperial Valley. This year's addition will be some 5 mi. of line between Drops 3 and 4.

Distribution

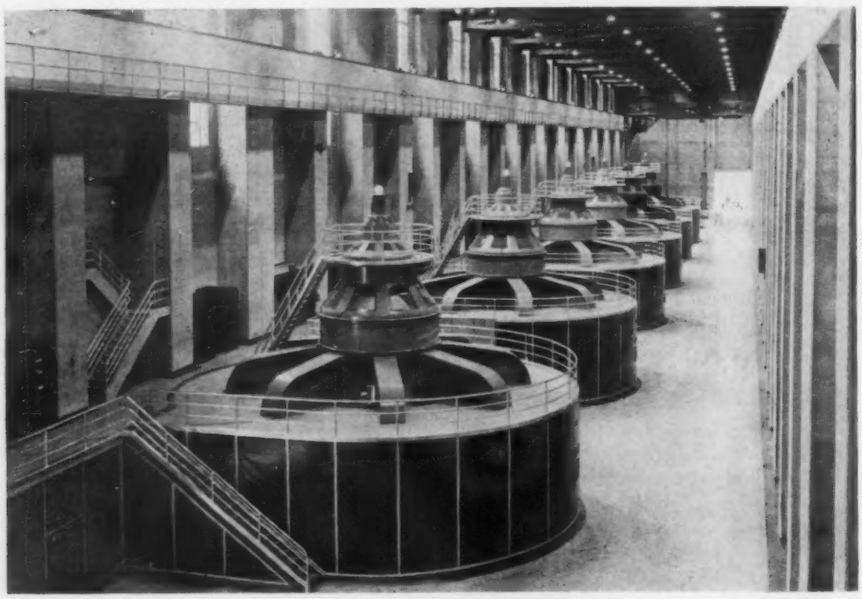
During 1938, we constructed 600 mi. of 4- and 12-kv. rural lines, and about 100 mi. of 4-kv. urban lines. An additional 100 mi. is scheduled for this year.

Substations

Thirteen substations added last year totalled 20,500 kva. This year, it is planned to add 24,000-kva. at the generating plants, and 2,500-kva. at several city substations.—*M. J. Dowd, chief engineer and general superintendent.*

Boulder Power Plant

Unit	Rated Horsepower	Rated Kv-a	Date of operation	Generates for use of	Operated by
N-0	3,500	3,000	September 11, 1936	Station service	City of L. A.
N-1	115,000	82,500	December 28, 1936	City of L. A., Burbank	(Lessee)
N-2	115,000	82,500	October 26, 1936	Glendale, Pasadena	"
N-3	115,000	82,500	March 18, 1937	and State of Nevada	"
N-4	115,000	82,500	November 14, 1936		"
N-5	115,000	82,500	June 26, 1938	Metropolitan Water	"
N-6	115,000	82,500	August 31, 1938	District	"
N-7	115,000	82,500	(Future)	"	"
N-8	115,000	82,500	(Future)	"	"
A-0	3,500	3,000	September 11, 1936	Station service	"
A-1	115,000	82,500	Approximately 1941	City of Los Angeles	"
A-2	115,000	82,500	Approximately 1941	City of Los Angeles	"
A-3	115,000	82,500	(Future)	States of Nevada and Arizona	"
A-4	115,000	82,500	(Future)	So. Cal. Ed. Co.	So. Cal. Ed. Co.
A-5	115,000	82,500	(Future)	So. Cal. Ed. Co.	"
A-6	115,000	82,500	July, 1939	So. Cal. Ed. Co.	"
A-7	115,000	82,500	June, 1939	So. Cal. Ed. Co.	"
A-8	55,000	40,000	August 18, 1937	Nev. Cal. Elec. Corp.	"
A-9	55,000	40,000	Future	City of Los Angeles	City of L. A.



Los Angeles Bureau of P. & L.

This year's budget figures for new and improved plant approximates $26,962,000. This includes a new line to Boulder, originally scheduled for construction last year, but subsequently postponed. Exclusive of this, the amount budgeted for similar work at this time last year was $12,590,000.

This year's schedule contemplates an increase on the order of $1,000,000 in expenditures for generating improvements, receiving stations, distribution stations, etc., and a decrease of roughly the same magnitude in distribution work.

Transmission

Construction of the third 275-kv. transmission circuit from Boulder power plant to Los Angeles is the major project in the 1939 program. With appurtenant facilities, estimated cost of the third circuit is $15,000,000. Contracts for $5,000,000 of materials for the line already have been let.

For receiving stations, including construction of Receiving Station D (120,000 kva.), $2,500,000 has been budgeted. Distributing station work, including two new stations, one of which is now under construction, is expected to require $2,150,000.

Generation

Betterments and replacements of hydro and steam generating facilities, costing $600,000, provide for an induced draft fan and a 2000 kw. house turbine at the Seal Beach plant and 34.5-kv. oil circuit breakers at Alameda steam plant, in addition to miscellaneous improvements.

The Bureau's building program calls for an electric repair shop, warehouse and garage for the underground system operating forces; two new branch commercial offices; enlarged quarters for the Bureau's staff operating Boulder power plant; and other smaller structures. Total cost of the buildings is estimated at $1,500,000.

Distribution system activities for this year will include: (overhead) 55 miles of pole line; 11 circuit miles of 34.5-kv. line; 26,000 kva. of transformer capacity; (underground) 11 conduit miles; 58 duct miles; 135 cable miles; 8000 kva. of transformer capacity. Estimated expenditures are: $757,000 for 34.5-kv. underground lines; $4,455,000 for other distribution extensions, betterments and improvements.—*E. F. Scattergood, chief electrical engineer and general manager.*

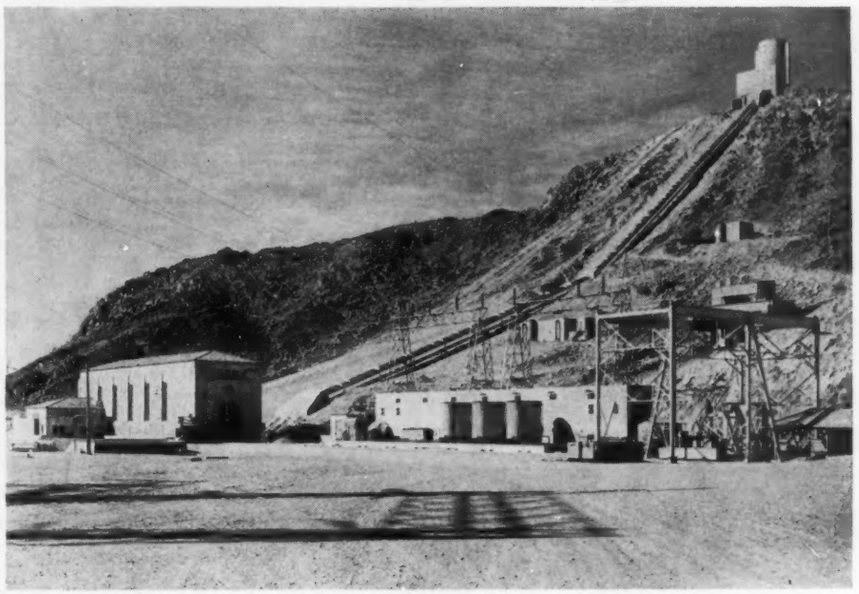
Metropolitan Water Dist.

In 1938, the MWD of Southern California built five pumping plants, each with an initial capacity of 600 sec.-ft., the heads varying from 291 to 600 sec.-ft. Ultimate capacity will be 1,600

sec.-ft., total lift, 1,634 ft. At present, each plant is being equipped with three motor-driven, vertical shaft, centrifugal pumping units, requiring three 4,300-hp., six 9,000-hp. and six 12,500-hp. synchronous motors, operating at 6,900 volts.

Power from Boulder is transmitted at 220 kv., 237 mi. over the District's line. The transformer installation comprises four units of 22,000 kva. each at Gene, seven of 15,000 kva. each at Eagle Mountain and Hayfield, and four of 5,500 kva. each at Iron Mountain. This includes three spares. At Intake, 28,000 kva. in transformers is installed, served by a short 69-kv. line from Gene. Switching facilities, station power, lighting and other equipment are similar to that used in any public utility system. All operations in each plant are electrically controlled from a central control room.

Cost of the five plants will be about $15,000,000, of which $3,600,00 has been expended for electrical equipment exclusive of cost of erection. No additional electrical installation is contemplated during 1939.—*F. E. Weymouth, general manager and chief engineer.*



EAGLE MOUNTAIN pumping station, Metropolitan Water District of Southern California. Eventually, the District will be Boulder Dam's biggest customer. The four other District pumping plants are similar. Note shadow of the transmission structure in foreground

Montana Power

Last year, a major addition to generating capacity was completed with the dedication of Frank M. Kerr hydroelectric project. The new plant has 56,000 kw. installed and can accommodate a second unit. Involved were a 200-ft. arch dam, 56,000 kva. in transformers, switchgear, etc.

Our activities for the coming year will be limited to routine maintenance and what little new construction we may do is hardly worth mentioning. *H. H. Cochrane, chief engineer.*

Mountain States Power

A somewhat enlarged program of system additions and improvements probably will be undertaken during 1939. Approximate figures show that $263,000 was spent for such work in 1938, while $275,000 is budgeted for 1939, both figures excluding automobile and office expense.

Only addition to generating facilities last year was a 250-kw. unit, driven by an internal combustion engine. Distribution additions amounted to about 99 mi., with the installation of 350 kva. in transformer capacity. The 1939 program will embody the usual types of system improvements.—*G. McClellan, chief engineer.*

Nevada-California Electric

This year we contemplate a somewhat larger program. In 1938, $945,000 was spent for new and improved facilities. This year, the figure is expected to exceed $1,040,000.

Generation

No new capacity was added last year, none is scheduled for 1939. Last year's modernizations involved $27,500 for installation of semi-automatic control in one plant, rebuilding of switchboard an delectrical system in another, and miscellaneous improvements. Contemplated for 1939 is an expenditure of $35,000 for: application of semi-automatic features to two plants, building some low-voltage lines for operating purposes, making various improvements to operators' cottages, local water system, etc.

Transmission

About $25,000 went for miscellaneous improvements in 1938, and from $25,000 to $30,000 is contemplated for 1939. No new lines, and negligible reconductoring are recorded for either year. The 1938 program included the reinsulation of some 50 mi. of 88-kv. line, the change being from pin to suspension type insulators.

Distribution

This year's schedule embodies the addition of 45 mi. of line (same as last year), the expenditure of about $80,000 for rebuilding (as compared with $90,000) and about $35,000 for modernizations (against $28,000).

Transmission Lines From Boulder Power Plant

To	Approx. length in miles	Owner	No. of circuits	Sending kv.	Capacity kw.	Conductor	Towers	Load served	Date energized
Los Angeles	266	L. A. Bureau P & L	2	287	240,000**	Hollow copper	Steel	Firm metropolitan	10/36
Los Angeles	266	L. A. Bureau P & L	1	287	150,000	Hollow copper	Steel	Firm metropolitan	'39
Los Angeles	230	So. Calif. Edison	1	230	165,000	Aluminum	Steel	Firm metropolitan	'39
Pioche	165	Linc. Co. Power Dist.	1	69	*	Hollow copper	Wood H-frame	Mining industries	5/37
San Bernardino	191	Nev.-Cal. Electric	1	138		Aluminum	Steel	Firm urban and rural	6/37
Colorado R. Aqueduct	237	Met. water Dist.	1	230	140,000	Aluminum	Steel	Pumping plants	11/38
Las Vegas	25	So. Nev. Power Co.	1	34.5		Copper	Wood poles	Industrial	3/37
Kingman	68	Citizens Utility Co.	1	69	*		Wood poles	Industrial	10/38
Needles	91	Needles Gas & El. Corp.	1	69	*	Aluminum	Wood poles	Industrial	9/38

* 3 circuits fed from 1-10,000 kv-a bank.
** Reliable operating capacity with one section out of service.

STEAM-ELECTRIC motive power was a General Electric contribution to railroading last year. This is the 5,000-hp. unit built for Union Pacific. Top speed is 125 mi. per hr., total weight with full tanks is 530,000 lb. It consists of two identical units, capable of multiple or independent operation, and can make a 500 mi. run without stops

Main items in 1938 were 6,050 kva. in added transformer capacity, installation of two 300-kva., 2,300-volt, 3-phase, step-voltage regulators, installation of 720 kva. in pole-top capacitors. No capacitors are to be added this year, but installation of four feeder regulators may account for $19,000, while some $45,000 may be spent for breaker modernizations and replacements.—*R. H. Halpenny, electrical engineer.*

Northwestern Electric

For new and improved facilities in 1938 we spent about $255,000 on our own system and about $46,000 on leased property. For 1939, it is estimated, we will spend $235,000 and $42,000 respectively.

Generation and transmission can be covered briefly. Last year's items consisted of a new 315-cu.ft. compressor, and the addition of about 200 ft. of 66-kv. line, incidental to road relocation. This year's work, likewise, will consist of minor, normal changes.

Distribution

Customers' meters of the old type are gradually being replaced by socket-type new-sequence meters. Work is also being continued toward the eventual conversion of 3-wire to 4-wire underground distribution. In 1938, a total of 720 kw. was cut over. As to lines, 8.67 mi. were added.

Substations and Equipment

Changes were made in transformer locations, but net gain in capacity was only 600 kva. Two new 2,400-volt feeder positions were added in Portland substations and a tie was installed to serve Western Power & Light Co. in Washougal, Wash. Two new regulators were added at Prindle substation in Washington. Budgeted for this year are a new 600-kva. substation to provide for increased load in Portland, and one additional 2,400-volt feeder at Camas, Wash., substation.

Leased property referred to is owned by Pacific Power & Light Co. and leased to, and operated by, Northwestern.—*O. L. LeFever, general superintendent.*

Pacific Gas and Electric

An increase on the order of $11,000,000 is budgeted for new and improved facilities during 1939. In round numbers, the figures are as follows:

	1938	1939
Production	$3,002,000	$11,904,000
Transmission	1,435,000	3,834,000
Distribution	8,619,000	8,335,000
Total	$13,056,000	$24,073,000

These figures do not include San Joaquin Power. They do include $1,600,000 for the initial construction on Feather river, mentioned below, which will be contingent upon FPC approval.

Generation

Only generating capacity actually added to the system during 1938 was Unit No. 4 at our Station C, Oakland, the installation of which has just been completed. This comprised a 50,000-kva. turbo-generator, together with related steam and electrical equipment, and the reconstruction of the entire switching installation. This expenditure has been to the order of $5,000,000.

During the year, designs and purchases of major equipment were in progress for three new steam-electric generating plants at Avon, Martinez, and Oleum respectively, adjacent to the oil refineries, each of which is to be of 50,000-kva. capacity. The plants at Avon and Martinez are scheduled for completion during 1939 and that at Oleum in 1940. The use of steam pressures up to 1,525 lb. per sq.in. and total temperatures up to 950 deg. F. are in the front rank of modern practice in this field. The plants represent a combined expenditure of some $15,000,000.

Consideration of the comprehensive plan for developing the North Fork of the Feather river continues. This will ultimately involve construction of six plants between Caribou and Big Bend, at a cost of some $54,000,000. Application for a preliminary permit has been filed with FPC and is still pending before that body. The Cresta plant, the fourth of the chain, estimated to cost $9,500,000, will be the first to receive attention, as discussed last year.

Under the heading of "Modernization and Improvements" the following three rather minor items may be mentioned:

(a) *Station B Eureka*—Plans were made for the removal of one 3,500-kva. turbo generator, together with its condenser and related equipment, from Station W, Oakland, and its reinstallation at Station B, Eureka. The work is now in progress and will be completed in 1939.

(b) *Potter Valley Power House*—Designs and selection of equipment for a new 5,500-kva., 720-r.p.m., horizontal turbine and generator, together with related transforming and switching equipment, were in progress, with construction scheduled for 1939. This unit will replace old Units No. 1 and No. 2, which are obsolete. The new equipment will be fully automatic.

(c) *Phoenix Power House*—Designs and selection of equipment for a new 2,000-kva. unit, driven by a single overhung impulse wheel, together with related equipment, were carried forward during 1938, with construction scheduled for 1939. Thus, the second oldest plant in the system, dating from March 1898, will be modernized for fully automatic operation.

Transmission

Owing to the fact that new generating capacity at present is being installed in steam, rather than in hydro-electric plants, the construction of major transmission lines has not been necessary of late. Certain transmission improvements were, however, made during 1938.

Another 110-kv. circuit was made available to our Coast Valleys Division by the completion of the second Morgan Hill-Salinas circuit, a distance of 36 mi., and to satisfy the load requirement, a 110-kv. circuit was built from Salinas to Soledad, 27 mi., all at an approximate cost of $450,000.

The second Drum-Summit 60-kv. line, to supply the Sierra Pacific Power Co. was completed as far as Spaulding Power House this year. There remains approximately 20 mi. of this line to finish in 1939 during a favorable weather season. A 60-kv. circuit was extended 6 mi. to serve a 10,000-kw. steel-mill load at Decoto.

The 110-kv. underground cable between Stations C and X in Oakland was completed this year at a cost of $350,000 and is now in operation. This serves to tie the hydro-electric facilities of the former Great Western Power system directly into the Pacific system.

Among other significant improvements may be mentioned the application of vibration dampers, completed during the year on several major lines. Construction of transmission in connection with Feather River, discussed as a possibility last year, has been postponed, pending FPC approval previously stated. No extensive reinsulating or reconductoring were undertaken or are contemplated.

The major transmission undertaking for 1939 will be in connection with the lines from the Avon and Martinez Steam Plants to our Newark substation, by way of our Contra Costa substation. These will involve 130 circuit mi. of double-circuit 110-kv. tower line, together with additional switchgear at Contra Costa and Newark substations. An increased supply of power for Sacramento is planned for early construction. A 60-kv. tie line, from Fulton to Trenton, has also been programmed.

Distribution

Some 350 mi. of distribution lines, of less than 50 kv., were added during 1938. Additions were scattered more or less uniformly throughout the system. There was, aside from this new mileage, a considerable amount of rebuilding and major maintenance in all of the operating divisions.

The energy requirements of the Golden Gate International Exposition were met by the construction of an underground duct line from Station C, Oakland, to the end of the Key Route Mole, thence by submarine cable to Treasure Island, representing an expenditure of some $600,000.

Substations and Equipment

The most interesting substation work during the year has been the construction on behalf of the railroads of the three substations for the service of the interurban trains which are to be operated over the San Francisco-Oakland Bay Bridge.*

New 60-kv. substations were constructed at Millbrae, Belmont and Decoto, and additional capacity installed at Station B, San Jose, Salinas, and Manteca, at a combined cost of $800,000. In the lower-voltage groups, 15 new substations of various sizes were constructed, one was more or less completely modernized, a number had transformer banks added, and three were reconstructed for fully automatic operation.

A total of 115,000 kw. of new transformers was installed in the above substations, to which is to be added a considerable number of smaller banks throughout the system.

For 1939, expansion work at Brighton, estimated to cost $266,000, and a new substation at Brunswick of 6,000-kva. capacity are now in their early stages. There is also in prospect a program of new construction, reconstruction, and expansion very similar in scope to that of the past year and involving similar expenditures. These substation improvements will tend further to increase system flexibility and reliability of the service.

Trends

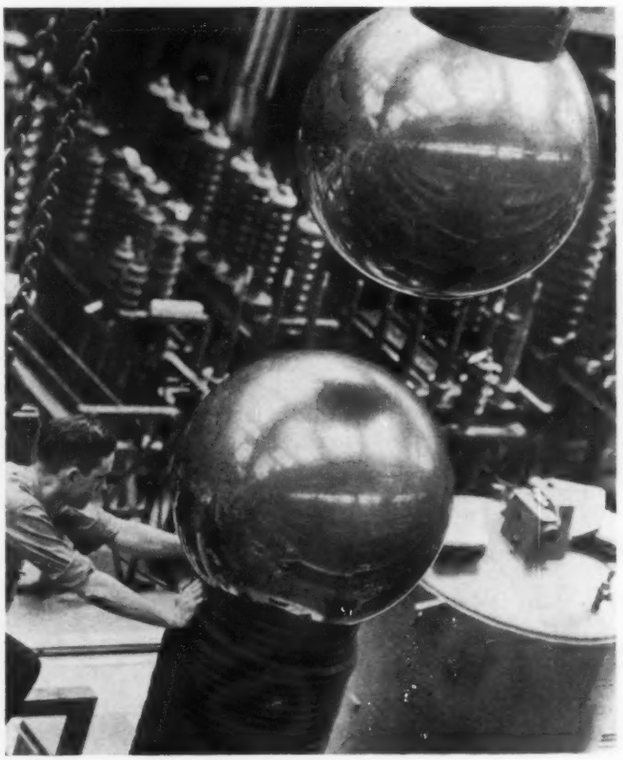
In the interest of operating economy there is a quite definite trend so far as this company is concerned, toward cutting over the smaller hydro-electric plants to automatic or semi-automatic operation. Certain types of distribution substations likewise indicate this trend.

There is also a trend toward the progressive replacement of certain electrical equipment in the older stations, which has been found to be inadequate in operation under the more severe short-circuit conditions of our consolidated system.

Although rural electrification throughout the company's system has reached a high degree of distribution saturation, examination is constantly being made of low-load-density areas, for further extensions of service where at all economically feasible. As an aid in justifying such extensions, there is a tendency of late toward the employment, with the express approval of the Railroad Commission, of materials, equipment and methods which are somewhat less expensive than required by Commission standards. These more or less experimental installations are permitting service to be extended to lean territories which could not otherwise be supplied. *—A. H. Markwart, vice-president in charge of engineering.*

Pacific Power & Light

In round numbers of dollars, our new and improved facilities will cost $790,000 this year, as compared with $750,000 in 1938. In general, programs for



BETTER EQUIPMENT was the contribution of all electrical manufacturers to the industry's progress. This spark gap in Westinghouse's East Pittsburgh works provides up to 750 kv. for testing circuit breakers. (Westinghouse photo.)

* Electrical West, January, 1939.

the two years are similar, except that 2,000 kw. of steam capacity was added last year, whereas none is scheduled for this. Modernizations and improvements to generation and transmission facilities will be normal. Last year, 58.6 mi. of distribution were added, and about 60 mi. is expected for 1939. A budget item provides for 4,125 kw. in transformer capacity, whereas 5,850 kw. was added in 1938.—*John Dierdorff.*

Portland General Electric

Our company has set up a construction budget for 1939 which exceeds by roughly $150,000 the amount actually spent last year. The figures are $1,503,319 in 1938, and $1,650,700 budgeted for 1939.

Major portion of this amount will be spent on distribution. The budgeted item is $1,179,700, as compared with $1,129,660 last year. Expenditures for the two years may be classified as follows:

	1938 Actual	1939 Budget
Steam Stations	$14,010	$3,700
Hydro Stations	47,675	198,100
Transmission	163,061	218,300
Distribution	1,239,660	1,179,700
Miscellaneous	148,913	50,900
Total	$1,503,319	$1,650,700

—*Walter Brenton, chief engineer.*

Public Service of Colorado

Although the full 1939 construction program is uncertain, no additional generating capacity is contemplated, and routine improvements in transmission, distribution and substation facilities are included in a budget item of $547,000. Last year saw the completion of several projects started in previous years.

Generation

At Valmont plant, a 225,000-lb.-per-hr., 425-lb. boiler, firing pulverized coal, was placed in service. A 2,000-kw. turbine was brought into service at Grand Junction, and construction has been started on a 30,000-lb.-per-hr. boiler. Another 3,000-kw. turbine and 50,000-lb.-per-hr. boiler were brought into service at year's end. Construction of a coal conveyor and overhead bunkers is in progress at Sterling. Minor hydro improvements included one new runner.

Transmission

Improvements to the 100-kv. Shoshone-Denver line included replacing conductors with ½-in. Copperweld over Hagerman Pass, adding to insulation. Counterpoise was extended. A reconductoring and reinsulating job on the Boulder Canyon-Denver Terminal 100-kv. line is nearing completion.

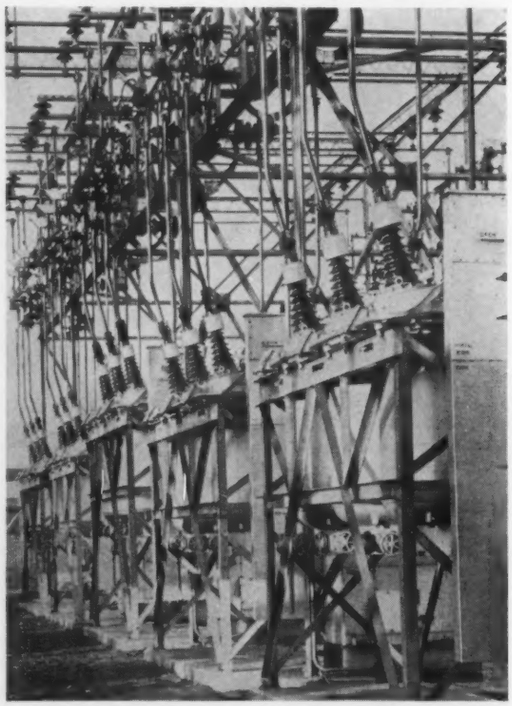
Distribution

Underground network has been extended in Denver, and highway relocations have necessitated extensive line relocations. Homebuilding activities required customers' extensions for which $82,000 was spent last year, while $32,000 went for rural extensions. Purchase of distribution transformers and watt-hour meters amounted to $125,000.

Substations

Work on the 100-kv. system included installation of three 10,000-kva. transformers at Valmont. Other work there included rebuilding the switchboard. At Greeley substation, a 5,000-kva. outdoor synchronous condenser was installed on the 44-kv. loop. Puritan substation, serving a coal-mining section, was rebuilt, including new switchgear, to raise distribution voltage from 6.6 to 13.2 kv.

TRANSFORMER ADDITIONS were widespread throughout 1938, and indications are that even more transformer capacity will be needed to complete the work scheduled for 1939. At the extreme right (opposite page) is a view of one of the stations modernized during 1938 by the Los Angeles Bureau of Power & Light. Immediately to the right are the breakers at Seattle City Light's new South Receiving substation. The breaker equipment includes one 196/230-kv. oil circuit breaker, two 15-kv. for condenser operation, sixteen 34.5-kv., and eleven 4-kv., metal-clad switchgear units. Control switchboard and 4-kv. apparatus are housed in a reinforced concrete building. The South station serves as the receiving point for energy from Skagit and as the terminus of the new transmission line—the latter another major job of 1938



Puget Sound P. & L.

Cost of new and improved facilities this year will probably be $1,250,000, a little less than the $1,375,000 spent for similar work in 1938. The 1939 activities will be similar in character to those listed below for 1938.

Generation

Capacity added: none. No major modernizations. At the old Snoqualmie Falls plant we did some work enclosing the switchboard gallery with air-conditioning facilities in the "Cavity" underground station, and some additional work was done in sectionalizing the busses to eliminate over-duty circuit breaker situations.

Transmission

The 4.3-mi., 55-kv., 30,000-kw. tie with city light, begun in 1937, was completed and energized. Coincidental with necessary replacement of poles at various points on the transmission system, we have changed pin insulator to wishbone suspension insulator construction on 44-, 55-, and 66-kv. lines.

Distribution

Additions totaled 183 mi., while rebuilding consisted only of normal maintenance.

Substations and Equipment

Transformers in the amount of 15,333 kw. were added, principally at substations for industrial power supply to paper mills. Tie-line load control by means of carrier current was put in service between the Washington Water Power system and our system at White River and Chelan Falls plants. —*G. E. Quinan, chief engineer.*

Rural Electrification

A table giving the status of Western REA projects, by states, as of Jan. 1, 1939, appears on page 52.

Salt River Valley

Addition of two 5,000-kw., diesel-driven generators contributed to the fact last year's expenditure for all types of new and improved facilities was $1,225,000. This year, it is proposed to replace three 600-kw., water-wheel-driven generators (25-cycle) with one 3,000-kw. generator (60-cycle). This year's total is expected to be $250,000.

Some 10 mi. of 11-kv. transmission line was built last year, and about 10 mi., at the same voltage, will be added in 1939. Distribution extensions

amounted to 15 mi. last year. Added transformer capacity amounted to 12,500 kva., and addition of 5,000 kva. is contemplated for 1939.—*F. L. Roe, superintendent of power.*

San Diego Consolidated

This company's total capital expenditures for the year 1938 were $1,789,000. The total budget for 1939 is $2,164,000, of which $1,693,000 is in the electric department.

Generation

During the year just past, we placed in operation at steam Station B, two new 200,000-lb.-per-hr. boilers and a 35,000-kw. turbine. However, although these did not go into service until 1938, the major part of the work was done in 1937, and they had best be viewed as part of the 1937 program. While no additional capacity is contemplated for 1939, there will be a major increase in the switchgear at Station B, involving duplication of the present switch house.

Transmission and Distribution

Additions to transmission: none. Reinsulation involved 23 mi. of coast 66-kv. line on which standard insulators were replaced with fog type. Distribution additions totalled 52 mi. last year, while approximately 14 mi. of urban distribution lines were rebuilt.

Substations and Equipment

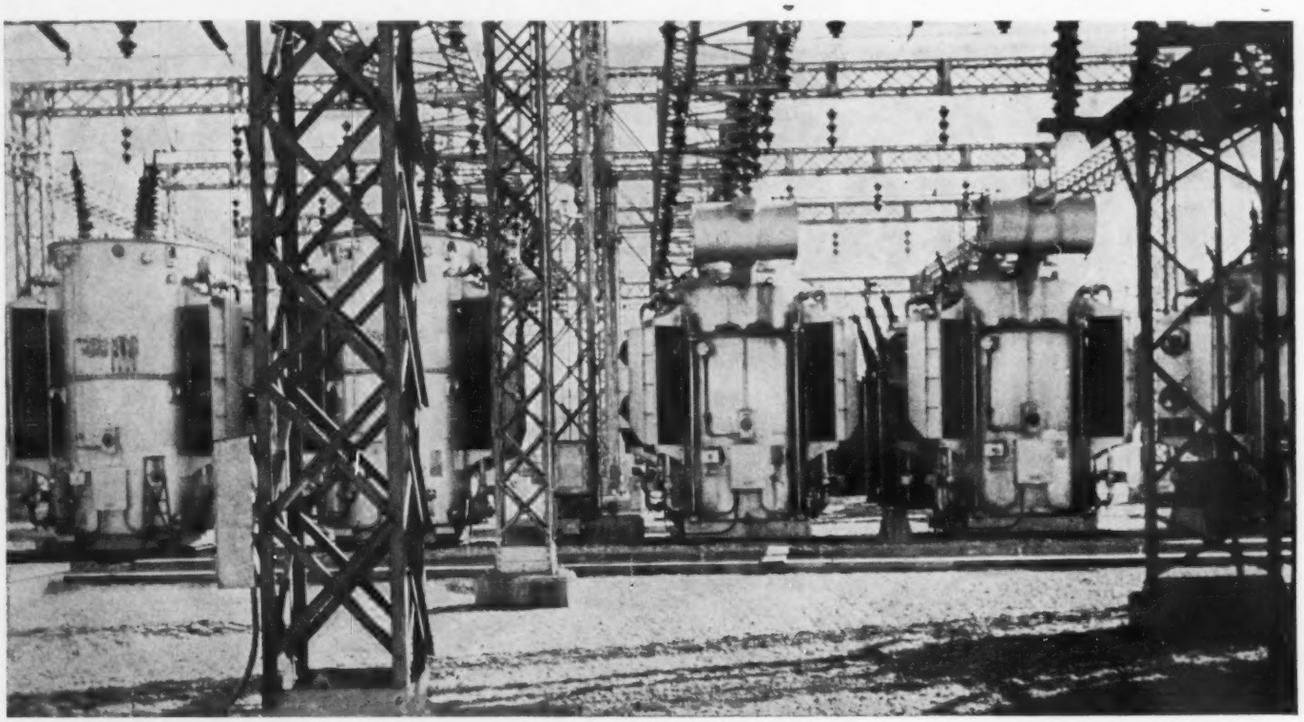
Hillcrest substation, a major unit serving San Diego, went into service in 1938. This station has a capacity of 12,000 kva. with two incoming 12-kv. feeders and five outgoing 4-kv., individually-regulated feeders. In the suburban cities of Chula Vista and National City, two 1,500-kva., steel-enclosed, unit-type substations were installed.

During the current year, work was begun on the conversion of four major San Diego substations to remote control. This work will be completed early this year.

Among contemplated major items are a new substation at Coronado, additional 33-kv. transformer equipment at Station B and Substation F, and extension of the underground system in San Diego, whereby several interstation feeders will be placed underground, and a more extensive use of static capacitors throughout the system. Eleven 180-kva. capacitors were installed last year. Added transformer capacity totalled 15,000 kva. Two 100-kva. step voltage regulators and 21 49-kva. regulators were added.

Trends

The company is looking forward in 1939 to a continued growth in business, partly through the acquisition of new customers, and partly through increased use per customer. No major extensions into new territory are contemplated, since those sections of San Diego and Orange Counties now served are already thoroughly covered.—*L. M. Klauber, vice-president in charge of operation.*



San Joaquin Power

A budget which raises to $3,275,000 the amount to be spent for new and improved facilities, as compared with $2,500,000 spent last year, has been set up for 1939. It embodies no changes in generating facilities, and none was undertaken last year.

Transmission

In 1938, 36 mi. of 70-kv. was removed, 40 mi. of 110-kv. added (capacity 30,000 kva.) providing greater transmission capacity to substations serving a rapidly growing agricultural load. Some 70-kv. line was added to provide 2-way service to one substation, and some 70-kv. line was removed where its function was taken over by the above-mentioned 110-kv. Another portion of 70-kv. line was cut to 11-kv. distribution, because of a permanent decrease in load in the section served.

In 1939, about 30 mi. of 70-kv. transmission line will be built, 10 mi. of which will serve a new substation south of Tulare Lake, whereas the other 20 mi. will serve a new substation at Zaca, in the Santa Maria District. A small amount of re-routing and re-building of 70-kv. lines will be undertaken.

Distribution

In 1938, 300 mi. were added. It is impossible to estimate at this time the length of distribution line which will be built in 1939 to serve new business, but it is estimated that about 40 mi. will be built to better operating conditions. Figures giving mileage of lines rebuilt during 1938 are not available.

Modernizations, 1938: 7.85 mi. of duct laid in down-town alleys of Fresno City in which cable will be installed replacing overhead distribution lines. Modernizations, 1939: Duct lines will be laid in alleys of two city blocks for installation of cables, and cables pulled into all ducts installed in 1938.

Substation Equipment

Transformer capacity added in 1938 amounted to 26,300 kva. Addition of some 5,000 kva. is expected this year. Last year's improvements in regulation included the addition of three step voltage regulators at substations, six in the field. Eleven will be installed this year, ten at substations, one in the field, and induction regulators will be installed on two circuits at Bakersfield steam plant substation.

Capacitor installations totalled 3,900 kva. in 1938, are estimated at 1,440 kva. for 1939. Breaker modernizations affected two 70-kv. and seven 110-kv. breakers last year, will affect five 70-kv. and one 110-kv. units this year. Modernization, in this case, refers to the installation of arc-quenching equipment.—*L. J. Moore, division executive engineer.*

Seattle City Light

Construction expenditures approximated $3,900,000 for system improvements in 1938, and are estimated at $4,200,000 for 1939. The following summarizes our activities.

Generation

No generating capacity was added or is scheduled. However, construction of Ruby Dam has been carried on throughout the year and will continue in 1939, accounting for a major portion of construction expense.

Transmission

A new transmission line from the Skagit generating plants to the South receiving substation in Seattle was completed late in 1938. This line is 121.8 mi., steel tower, double circuit, 240 kv., with a maximum capacity of 200,000 kva. on each circuit. At the first of 1938, a tie with Puget Sound Power & Light was placed in operation.

Distribution

Extension to serve customers was carried on throughout the year with approximately 25 mi. of primary distribution circuits added to the system. Distribution improvements in 1939 are expected to continue at about the same rate. There will be about 150 15-kva. line capacitors installed soon.

Substations and Equipment

Construction of the new South receiving substation has progressed during the year and the station will be completed in the early part of 1939. The initial installation includes 60,000 kva. in transformer capacity (three 20,000-kva. transformers) with a 30,000-kva. hydrogen-cooled synchronous condenser operating from tertiary windings on the transformers at 13.2 kv. The various apparatus includes one 196/230-kv. oil circuit breaker, two 15-kv. oil circuit breakers for condenser operation, sixteen 34.5-kv. oil circuit breakers, and eleven 4-kv. metal-clad switchgear units. The control switchboard and 4-kv. apparatus is housed in a reinforced concrete building. Two banks of transformers with a capacity of 30,000-kva. each were installed at the North receiving substation in 1938. One of these banks is connected to the above mentioned tie, the other to the original Skagit transmission line. Aside from completion of the new South receiving station, no construction is scheduled for 1939.—*W. J. McKeen, acting supt. of lighting.*

KENDRICK PROJECT in Wyoming is nearing completion by the Bureau of Reclamation. The power plant is known as Seminoe. Scheduled for operation this year, it will have a capacity of 32,400 kva. in three units (at 0.9 p.f.). The dam is on the Platte River

Sierra Pacific Power

The approximate amount spent for new and improved facilities during 1938 was $440,000. Tentatively budgeted for similar work during 1939 is $200,000.

Generation

No capacity was added last year. No hydro is contemplated for 1939, but a 50-kw. diesel may be installed. Improvements included installing new 40-kw. exciters with V-belt drives at two stations, substituting V-belt for flat belt at another, and miscellaneous additions. This year hydraulic turbine-gate controls may replace handwheels at Washoe hydro plant.

Transmission

A second interconnection with P. G. & E. was completed with 21.5 mi. of 60-kv. line. Another interconnection is contemplated.

Distribution

About 28 mi. of distribution lines were added during 1938. We are constantly rebuilding and modernizing our distribution, about $90,000 having been spent for miscellaneous extensions, replacements and improvements in the past 11 months.

Substations and Equipment

The above-mentioned tie involved duplicating 60-kv. regulating and switching equipment at Washoe power plant and substation. The 60-kv. bus and switch structure was rebuilt using steel. Rebuilding the 23-kv. portion is scheduled. Some transformers were shifted and about 3,600 kva. added to the system. Fulstone substation, renamed Genoa, was moved and rebuilt to avoid Carson river flood hazards.

Miscellaneous

Assorted improvements include rewiring control circuits at Washoe, 60-kv. lightning arresters at two subs, a new suspension bridge across Truckee river, an estimated $50,000 investment in water clarification plants now being constructed at two reservoirs.

About 225 new electric consumers were added to the system in November by purchase of the distribution system in the town of Loyalton.—*V. D. Armstrong, engineer.*

Southern Cal. Edison

During 1938 we spent approximately $9,000,000 for transmission lines, substations, distribution equipment and general system improvements. Our budget for 1939 contemplates an expenditure of $7,500,000. Cost of the unit at Boulder power plant which will be ready for service this year is not included as it is being installed by the government, from whom it will be leased.

Generation

No additional generating units were added to the system during 1938. About July 1939, we expect that our first unit at Boulder, with a capacity of 82,500 kw., will be ready for operation. The second 82,500 kw. unit at Boulder will probably be ready for service by the end of 1939 or the first part of 1940.

Transmission

During 1938, we completed the Boulder-Chino 220-kv. transmission line; however, it will not be placed in service until the summer of 1939. This line is 233 mi. long and is designed to operate at 220-kv.

Distribution

During the year we have added approximately 130 mi. of distribution. In 1938, a number of installations of sensitive ground protection were added to some of the 4-kv. lines and to one 7-kv. system which previously had been operated with solidly grounded neutrals.

The Chino Substation, the receiving end of the Boulder-Chino transmission line, having 75,000 kva. of transformer capacity stepping down from 220 to 66 kv. was completed in 1938.

Substations

The Boulder-Chino transmission line is designed to operate with Peterson coils at both ends instead of solidly grounded neutrals. Both coils have been received and the one at Chino is ready for service. A 50,000-kva. synchronous condenser has been installed at Chino and tested ready for service.

In addition to the above transformer capacity, 78,000 kva. of substation transformer capacity was added to the system during 1938. Two new distribution substations were built, two more substations to replace old stations at approximately the same locations were built, and transformers were added to a fifth station which had been used for switching purposes only before 1938.

Equipment and Miscellaneous

All new regulators installed during 1938 were of the step type rather than the induction type used in the past.

The program of modernization of relays was started during this year and will be continued during 1939.

A series of tests on 220-kv. oil circuit breakers was conducted during the year. These tests were made direct, on the system, with equivalent 3-phase, short circuit values running from 500,000 kva. to 2,300,000 kva.

The floods in March of 1938 caused considerable damage to a number of our smaller hydro plants located east of Los Angeles in the mountain canyons. All but two of these plants were rehabilitated and put back in service in time for the summer agricultural load. —*N. B. Hinson, Chief Engineer.*

City of Tacoma

An accelerated schedule of system additions and improvements will mark our 1939 program, with expenses estimated at $743,000 as compared with $615,000 in 1938. Generating capacity remains the same for both years, likewise transmission facilities. Addition of distribution will proceed during 1939 at about the same rate as last year, that is 12 mi. per year, and rebuilding will be carried out on a normal schedule.

Additions to transformer capacity will be smaller this year—about 2,000 kva., as compared with 6,000 kva. in 1938. One 300-kw. step-voltage regulator was installed and two more are scheduled to go in this year. A breaker modernizing program will affect 20 units, as compared with 6 in 1938.—*V. B. Jones, engineer.*

Tucson G., E. L. & P.

Last year we spent $67,000 on improvements, whereas $124,000 is budgeted for similar work in 1939. There were no capacity additions in 1938, and transmission building was confined to 3½ mi., built to supply a new distribution substation. Additions to distribution lines were 14.2 mi. Installations included 450 kva. in transformer capacity, induction regulators at one 750-kva. substation, and 585 kva. of pole-mounted distribution capacitors. One new feeder was added for the business section of the city.—*M. A. Pooler, vice-president and general manager.*

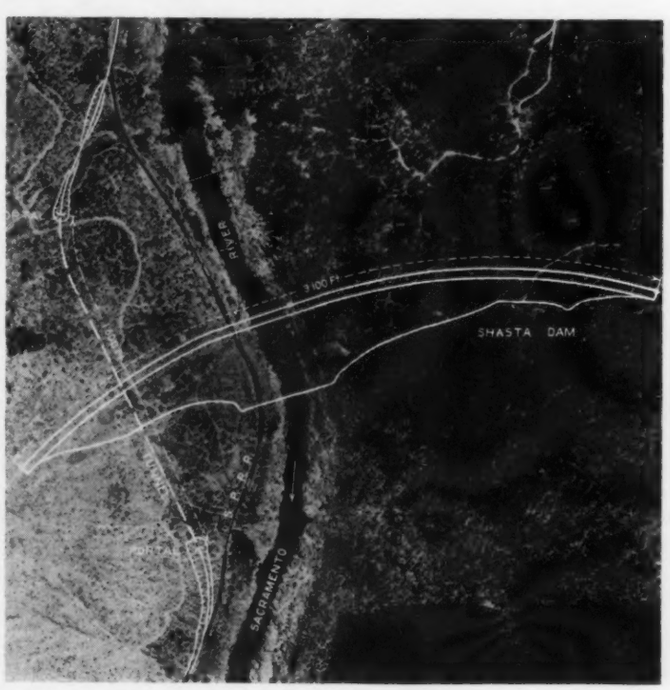
Utah Power & Light

Replacements and improvements undertaken by this company and its electric subsidiaries during 1938 totalled about $750,000, while in prospect for 1939 is an expenditure of $1,020,000 for the same items.

The only additions to generating capacity during 1938 were two small internal combustion units for a standby service at isolated locations. None is in prospect. Transmission line construction was limited to 8 mi. of new line, while 11 mi. of old lines were removed.

Distribution line additions totalled 161 mi., while 150 mi. of additions are estimated for this year. Additions to transformer capacity for 1938 and 1939 (estimated) are, respectively, 8,100 kva. and 6,900 kva.

Improvements and replacements in 1938 as well as those in prospect for 1939 do not in general fall in the foregoing classifications. Waterway reconstruction; addition to line transformers, customers service and meters, and capacity changes of distribution lines comprise a relatively large proportion of total.—*L. B. Fuller, chief engineer.*



SHASTA DAM, key unit in Central Valley project, will occupy the position drawn over this aerial photograph. Activity will get under way along the Sacramento this year. First job has been the relocation of Southern Pacific tracks, which can be seen to the left of the river

Washington Water Power

Proposed construction and replacement expenditures for 1939 will be to the extent of $1,425,000, exceeding by about $350,000 the cost of the 1938 outlay for the same work: $1,071,000.

Generation

No increase was made in the generating capacity in 1938. A 115-kv. oil circuit breaker of 1,000,000-kva. interrupting capacity was installed at Long Lake

Status of Western REA Projects

Project	Borrower's Name	Cumulative Allotments	1938 Allotment
ARIZONA			
4 Pinal*	San Carlos Irrigation & Drainage District, Coolidge, Ariz.	$ 145,000	.....
CALIFORNIA			
1 Imperial*	Imperial Irrigation District, Imperial	$ 700,000	.....
6 Modoc*	Surprise Valley Electrification Corp., Alturas	527,500	$ 27,500
16 Plumas*	Plumas-Sierra Rural Electric Coop. Inc., Portola	283,000	.....
State Total		$1,510,500	$ 27,500
COLORADO			
7 Mesa*	Grand Valley Rural Power Lines, Inc., Grand Junction	$ 218,000	$ 53,000
14 Alamosa*	San Luis Valley Rural Electric Coop., Inc., Monte Vista	317,500	167,500
15 Morgan*	Morgan County Rural Electric Assn., Ft. Morgan	255,000	5,000
16 Jefferson	The Intermountain Rural Electric Assn., Littleton	109,000	109,000
17 Prowers*	Southeast Colorado Power Assn., Lamar	533,000	358,000
20 Delta	Delta-Montrose Rural Power Lines, Delta	200,000	200,000
State Total		$1,632,500	$892,500
IDAHO			
4 Bonner*	N. Idaho Rural Elec. Rehabilitation Assn., Inc., Sandpoint	$ 213,000	$ 40,000
6 Bonner*	N. Idaho Rural Elec. Rehabilitation Assn., Inc., Sandpoint	71,750	36,000
10 Nez Perce*	Clearwater Valley Light & Power Assn., Inc., Lewiston	1,062,000	300,000
11 Kootenai	Kootenai Rural Electrification Assn., Inc., Coeur d'Alene	259,000	259,000
15 Idaho	Idaho County Light & Power Coop. Assn. Inc. Grangeville	191,000	191,000
State Total		$1,796,750	$826,000
MONTANA			
1 Ravalli*	Ravalli County Cooperative Electric Assn., Corvallis	$ 192,300	$ 58,700
2 Cascade*	Sun River Electrification Assn., Fairfield	174,000	74,000
5 Richland*	Lower Yellowstone Rural Electrification Assn., Sidney	144,600	29,600
9 Yellowstone	Yellowstone Valley Electrification Assn., Huntley	299,000	144,000
10 Madison*	Jefferson Valley Rural Electric Coop., Inc., Twin Bridges	171,000	121,000
11 Sanders*	Clark Fork Power Association, Thompson Falls	94,000	.....
12 Missoula*	Missoula County Electrification Assn., Missoula	77,000	.....
13 Flathead	Flathead Power Company, Kalispell	243,700	99,700
15 Fergus	Fergus County Cooperative Electric Assn., Lewistown	88,000	88,000
16 Park	Park Cooperative Electric Assn., Livingston	119,000	119,000
State Total		$1,602,600	$734,000
NEVADA			
4 Clark	Overton Power District No. 5, Overton	$ 173,000	$ 5,000
NEW MEXICO			
4 Eddy*	Central Valley Electric Membership Corp., Artesia	$ 260,000	.....
8 Roosevelt	Roosevelt County Electric Membership Corp., Portales	177,000	$177,000
9 Curry	Farmers Electric Membership Corp., Clovis	216,000	116,000
State Total		$ 653,000	$293,000
OREGON			
2 Lane*	Blachly-Lane County Coop. Electric Assn., Blachly	$ 127,000	$ 19,000
5 Clatsop*	Nehalem Valley Coop. Electric Assn., Jewell	82,000	17,000
14 Umatilla*	Umatilla Electric Cooperative Assn., Hermiston	211,000	72,000
17 Douglas	West Douglas Electric Cooperative, Camas Valley	132,000	132,000
State Total		$ 552,000	$240,000
UTAH			
6 Garfield	Garkane Power Co., Inc., Panguitch	$ 185,000	$185,000
7 Wayne	People's Light & Power Co., Loa	5,000	5,000
8 Duchesne	Moon Lake Electric Assn., Mt. Emmons	74,000	74,000
State Total		$ 264,000	$264,000
WASHINGTON			
8 Benton*	Benton Rural Electric Assn., Prosser	$ 103,500	$ 54,500
9 San Juan*	Orcas Power & Light Co., Eastsound	135,000	48,000
14 King*	Mutual Power & Light Assn. of Tanner, North Bend	22,200	3,000
18 Spokane*	Inland Empire Rural Electrification, Inc., Spokane	1,029,000	338,000
23 Grays Harbor*	Quinnault Light Company, Quinnault	79,000	19,000
25 Cowlitz	Public Utility, District No. 1 of Cowlitz County, Longview	216,000	128,000
27 Lewis	Public Utility, District No. 1, Chehalis	102,000	31,000
State Total		$1,686,700	$621,500
WYOMING			
3 Fremont	Riverton Valley Electric Assn., Inc., Riverton	$ 103,000	$103,000
5 Big Horn*	Big Horn Rural Electric Co., Basin	289,000	207,000
6 Goshen*	Wyrulec Company, Lingle	243,000	25,000
10 Platte*	Wheatland Rural Electric Assn., Wheatland	68,000	3,000
11 Lincoln*	Lower Valley Power & Light, Inc., Afton	426,000	197,000
12 Park*	Garland Light & Power Co., Powell	72,300	22,300
13 Washakie*	Washakie Rural Electric Co., Worland	56,500	6,500
State Total		$1,257,800	$563,800

*Energized in part or in whole.

GENERATING PLANTS*

Project	Location of Plant	Type
Washington 9 San Juan	Orcas Island, San Juan County	Diesel
Washington 23 Grays Harbor	Quinnault, Grays Harbor County	Hydro
Oregon 2 Lane	Blachly, Lane County	Hydro
California 6 Modoc	Near Alturas, Modoc County	Diesel
Wyoming 11 Lincoln	North of Freedom, Lincoln County	Hydro

*All of these plants were in operation at the end of 1938.

station. The remainder of the construction consisted of miscellaneous improvements at a number of generating stations. This year, at Long Lake station, frequency and load control will be modernized and some of the high tension switch-gear rehabilitated. A new outdoor high tension switching station will be constructed at Little Falls station.

Transmission

Construction during 1938 consisted only of minor rebuilding, without increase in total mileage. In 1939, nine miles of 60-kv. transmission line in Spokane valley will be rebuilt. Approximately 16 mi. of 22-kv. line will be rebuilt near Grangeville and Troy, Idaho.

Distribution

During 1938, distribution systems were rebuilt in four communities (Almira, Hartline, Odessa and Washtucna). In addition, there were partial rebuilds in five towns (Clarkston, Davenport, Lewiston, Moscow and Coeur d' Alene). About 28 mi. of distribution feeders were rebuilt, and a new 14½-mi. feeder was constructed. A four-circuit, 2,300-volt river crossing was built over Snake river.

Distribution systems in eight towns and cities will be completely rebuilt in 1939. Sections of systems will be rebuilt in six communities. Approximately 46 mi. of distribution feeders will be rebuilt and a new 5-mi. feeder will be constructed.

Substations and Equipment

New substations were built at Diamond and Vera, Wash. and capacity at Juliaetta and Opportunity was increased. New equipment was installed at Almira, Colfax, Coeur d'Alene, Grangeville, Latah Junction and 29th Ave. in Spokane.

New substation required installation of 7,000 kva. of new transformers, 110-amp., 13.8-kv. step voltage regulator, a number of oil circuit breakers and one installation of carrier-current street-light control equipment. In Spokane, a new underground transformer vault with 450 kva. capacity was built.

Five substations will be added this year. The capacity of a number of other substations will be increased. New equipment, such as oil circuit breakers, regulators and operating batteries, will be installed in eight substations. A new underground transformer vault will be installed in Spokane.

A cost breakdown indicates:

	1938	1939
Generation	$38,000	$131,000
Transmission	107,000	71,000
Distribution	759,000	1,052,000
General	167,000	171,000
Total	$1,071,000	$1,425,000

J. E. E. Royer, vice-president and general manager.

Sales, Past and Future

By Clotilde Grunsky

Demonstration—one of the keys to successful selling

THIS is the story of a year which has known a few peers. Electrical sales in 1938 were down. True, over $100,000,000 were spent for electrical merchandise in the eleven Western states. And there were several millions more spent for commercial lighting, industrial power, agricultural power, etc. But generally speaking, sales were nothing to shout about.

This, at least, is the consensus of companies representing 88.4% of all domestic customers in the West, plus British Columbia and the western corner of Texas. These companies serve 2,682,421 residence customers, 283,152 rural customers and 445,139 commercial customers.

What these customers bought in the way of appliances and electricity and what records the power companies made in the selling of these commodities is the purpose of this summary.

Remarkable were the records of some Northwest companies in respect to the average kw.-hr. consumption of domestic customers. Far out in front of the pack was California-Oregon Power Co. with a score of 2,166 kw.-hr. Second was Washington Water Power Co. with 1,985 kw.-hr. Third was Idaho Power Co. with 1,709; fourth, City of Tacoma with 1,692.

Highest percentage of range saturation was shown by Sierra Pacific Power Co. (53). Highest percentage of water heater saturation was shown by Northwestern Electric Co. (36). Highest percentage of refrigerator saturation by Sierra Pacific Power (65.7).

Companies representing 2,012,706 domestic customers reported total sales of domestic appliances amounting to roughly $71,000,000. Applying this figure to the total number of domestic customers in the West, you get a figure of $105,000,000. This is an average of $35.26—undoubtedly a low figure.

Basis for this figure is accurate reports for nine of the more important appliances and rough estimates (which, in most cases, are below the actual figures) for small appliances. One of the companies which made a check on one occasion and now bases its estimate on that knowledge is among the highest reporting. It allows $59.15 per customer, with an increase in annual kw.-hr. used during the year of 71.

More accurate than the dollar volume of appliances sold, however, is the analysis of the actual number of appliances sold. Here are found some interesting facts:

More appliances were sold by dealers than by power companies. For example: Dealers sold 64% of all ranges; 57% of all water heaters; 71% of all refrigerators; 80% of all IES lamps, and 98% of all washers.

Compared with 1937 figures, the per cent of decrease in sales is rather less than that reported in government figures for the average sales of appliances through Western retail outlets. Ranges showed a loss of 3.5%; refrigerators, 8%; washers, 12%; ironers, 24%; cleaners, 14%; air heaters, 18%, and IES lamps, 16%. Increases were recorded by water heaters (8%) and radio (6%).

Now, what were the individual company's records on various appliances?

Idaho Power Co. and its cooperating dealers were the best range salesmen. They sold 119 ranges per 1,000 domestic customers. Sixty per cent of these sales were by the dealers. California-Oregon Power Co. ranked second with 70 ranges per 1,000 customers. This company has a policy of giving bonuses to dealers as well as company salesmen; and it furnishes free installation and does considerable promotion work in the nature of cooking schools, etc. Third was Sierra Pacific Power Co., whose record—the more remarkable in view of the fact that the company itself does no merchandising but encourages dealers with bonuses and advertising allowances—was 62 per 1,000 customers.

In the matter of water heaters, Idaho Power and Copco again rank one-two. Idaho sold 59 heaters per 1,000 customers; Copco, 42 heaters per 1,000 customers. Third place went to Seattle City Light, reporting 30 heaters per 1,000.

Surprisingly enough, the largest sale

of electric refrigerators is also reported from the Northwest. First was the territory of Pacific Power & Light Co. with 124 refrigerators per 1,000 customers. Then came Copco, with 121. Idaho was beaten out for third (its score was 114 per 1,000) by Tucson Gas, Electric Light & Power Co., which sold 115 per 1,000 customers. Central Arizona Light & Power was fifth; San Diego Consolidated Gas & Electric Co. sixth.

Pacific Power & Light territory also took top honors in the washer division with a record of 119 per 1,000 customers. Utah Power & Light Co. placed with 105; Northwestern Electric Co. showed with 89.

In comparison with these figures, ironers sold very badly. Idaho Power's territory ranked highest with a record of 13 ironers per 1,000 customers or one ironer per 7.4 washers. Pacific Power reported 11 per 1,000 customers, but only one per 11 washers. Followed then in a tight knot Sierra Pacific (10.5 per 1,000); Montana Power Co. (10.4); Los Angeles Bureau of Power & Light (9.7), and San Diego Bureau of Radio & Electrical Appliances (9.4). Total figures for the entire West show that in 1938 one ironer was sold for every 6.1 washers. In 1937 the ratio was 1 to 5.5.

Records of dealer sales of IES lamps are kept by only a fourth of the companies reporting. Power company sales are, however, more complete. These figures reveal that Washington Water Power Co. sold 232 lamps per 1,000 customers; Northwestern Electric Co., 200 per 1,000 customers; Portland G. E., 196 per 1,000; Central Arizona, 181. El Paso Electric Co. reporting company sales only, had the outstanding record of 196 lamps per 1,000 customers.

Air conditioning reports come, as is natural, largely from the Southwest, where hot dry summers make evaporative cooling necessary to comfort. The heat of the San Joaquin Valley, however, put San Joaquin Light & Power Co. at the top of the list with 2,645 installations. Second was Nevada-California Electric Corp. with 1,982; third, Central Arizona with 1,862; fourth, El Paso with 1,353, and fifth, Utah Power with 1,235.

Other commercial and industrial data show the following:

Best record for average annual power consumption by commercial customers was hung up by Tucson Gas, which reported use of 11,804 kw.-hr. Next came Sierra Pacific Power with 10,200 kw.-hr. Then, close together, Northwestern Electric with 9,500 and Puget Sound Power & Light Co. with 9,388.

Best record for average annual power consumption by industrial customers was established by Montana Power with a use of 618,641 kw.-hr. Washington Water Power was second with 560,398, City of Pasadena, third with 377,000; El Paso Electric, fourth with 355,000.

Leaders in the commercial lighting field were B. C. Electric Railway Co., which reported 3,587 added kw.; Utah Power, 3,232; Puget Power, 2,700, and Pacific Gas and Electric Co. $405,000 E.A.R.

Largest industrial sales were reported by Los Angeles Bureau (57,900 added kw.); Washington Water Power (13,000 added kw.), and P. G. & E. ($1,163,000 E.A.R.).

What will happen in 1939 is a matter of conjecture. No company is very optimistic. Most have set their appliance sales quotas a little higher than actual 1938 sales, but only a few go so far as to add any significant comment. On the whole, however, the outlook is considered to be pretty good.

Following tables and short articles give further information on this subject as well as on all sales and selling methods of the 30 reporting companies. The tables are as complete as they can be made. Text serves only to explain significant points more fully.*

CUSTOMERS AND CONSUMPTION

	RESIDENCE CUSTOMERS		FARM CUSTOMERS		AVERAGE RESIDENCE KW.-HR. CONSUMPTION				
	1937	1938	1937	1938	1934	1935	1936	1937	1938
Albuquerque Gas & Electric	10,611*	11,240						599	630
B. C. Electric Railway	91,695†	93,550†	15,600‡	16,600‡	1,000	975.2	977.2	991	1,003
California-Oregon Power	21,606	23,078	3,175	2,705	1,618	1,729.9		2,100	2,166
Central Arizona L. & P.	21,600	22,407	772	793	708	731	821	910	975
City of Alameda, Calif.	10,032	10,293			750	798	857	968	1,090
City of Burbank, Calif.	6,455	7,500			533	601		853	882
City of Pasadena, Calif.	26,554	27,020						887	942
City of Seattle	80,919	81,300			1,050	1,075	1,125	1,268	1,380
City of Tacoma	31,212	31,838			1,554	1,563	1,614	1,632	1,692
Coast Counties G. & E.	18,412	19,400	1,386	1,360				820#	796
El Paso Electric	19,005	20,000	1,236	1,250				952	1,050
Idaho Power	33,931	35,840	12,701	13,900	1,220	1,276	1,358	1,577	1,807
Los Angeles Bureau P. & L.	330,630	347,500			588	624	692	782.6	840
Montana Power	65,228	66,781	2,451	2,702	705	724	781	815	822
Mountain States Power	44,079	49,425	5,836	6,340		792	971.9	1,156	1,137
Nevada-California Electric	26,156	27,900	1,416	1,450				1,291	1,390
Northwestern Electric	34,523	34,860	4,237	4,334	1,200	1,202	1,240	1,308	1,344
Pacific Gas & Electric	577,960	590,000	46,963	49,500	726	731	791	849	900
Pacific Power & Light	41,040	43,000	10,594	11,200	1,236	1,279	1,382	1,475	1,557
Portland General Electric	111,435	116,000	34,977	38,225	993	1,046	1,160	1,237	1,317
Public Service Co., Colo.	104,175	106,224	4,247	4,671	498	534	579	620.3	653
Puget Sound P. & L.	130,755	138,200	30,201	30,200	993	1,002	1,141	1,236	1,295
San Diego Consolidated	60,850††	62,046††	13,517††	14,609††	753	630	733	835	900
San Joaquin L. & P.	85,741	90,000	62,752	65,000	972	1,020	1,100	1,187	1,255
Sierra Pacific Power	10,590*	11,131			922	1,005	1,181	1,354	1,440
Southern Calif. Edison	415,050	430,000			680	737	801	910	952
Southern Colo. Power	21,871	22,170	1,350	1,425	580	623	682	741.1	815
Tucson Gas, Elec. L. & P.	12,060	13,000	150	156				876	913
Utah Power & Light	83,066	84,343	16,607	16,521	716	766	876	1,067	1,067
Washington Water Power	64,240	66,375	217	211	1,610	1,665	1,775	1,879	1,985

*Includes farm customers. †Includes all territory comprising greater Vancouver and Victoria.
‡Includes all small towns and farmlands outside urban territory. ††According to new system of classification.
#Free electricity in February and March accounted for 60 kw.-hr. over normal.

B. C. Electric Railway

Although more than 1,800 houses were built in greater Vancouver last year and B. C. Electric Railway Co. in-

* Electrical West is indebted to the following for the Review and Progress information: A. E. Holloway, v.-p. in charge of sales, San Diego Consolidated Gas & Electric; William H. Grove, gen. sales mgr., Central Arizona Light & Power; George T. Bigelow, gen. com. mgr., Nevada-California Electric; Clyde Houston, com. mgr., and H. C. Rice, mgr. of domestic sales, Southern California Edison; Burdett Moody, business agent, Los Angeles Bureau of Power & Light; Kenneth Hampton, store mgr., San Joaquin Light & Power; H. H. Courtright, pres., Valley Electrical Supply Co., Fresno; R. E. Fisher, v.-p. in charge of public relations and sales, Pacific Gas and Electric; H. W. Edmund, sales mgr., Coast Counties Gas & Electric; Glenn Jackson, v.-p. in charge of sales, California-Oregon Power; J. C. Plankinton, mgr. of sales bureau, Northwestern Electric; A. C. McMicken, gen. sales mgr., Portland General Electric; D. B. Leonard, com. mgr., Pacific Power & Light; Patrick Johnson, gen. sales mgr., Puget Sound Power & Light; Phil Spowart, sales mgr., City of Seattle; Lewis A. Lewis, asst. gen. mgr., Washington Water Power; I. L. Comstock, asst. to v.-p., Montana Power; Gaylord B. Buck, gen. com. mgr., Public Service Co. of Colorado; G. W. Milliken, v.-p. in charge of sales, Southern Colorado Power; W. A. Huckins, sales mgr., Utah Power & Light; W. C. Mainwaring, gen. sales mgr., and E. N. Horsey, mgr. of light and power dept. (Victoria), B. C. Electric Railway; F. G. Hodge, sales mgr., Sierra Pacific Power; H. A. Lewicki, sales mgr., City of Alameda; C. S. Kirk, mgr. of appliance div., City of Burbank; B. F. DeLanty, gen. mgr., City of Pasadena; A. Anderson, light div., City of Tacoma; R. E. Gale, com. mgr., Idaho Power; E. A. Werner, merch. mgr., El Paso Electric; H. L. Pinkerton, com. mgr., Albuquerque Gas & Electric; W. H. Howe, com. mgr., Tucson Gas, Electric Light & Power; H. E. Farris, sales mgr., Mountain States Power; Bert Reynolds, promotional director, Electric Appliance Society of Northern California; F. L. Hockensmith, gen. mgr., Electrical Development League of Southern California; J. Clark Chamberlain, sec.-mgr., San Diego Bureau of Radio & Electrical Appliances; George E. Lewis, mgr., Rocky Mountain Electrical League; Elias J. Strong, mgr., Electrical League of Utah.

creased its number of rural customers by 10%, appliance sales remained about the same as in 1937 and kw.-hr. consumption increased only slightly. Reporting on 1939 industrial development, the company says it does not expect any great increase. But there is a steady number of inquiries about power loads for contemplated small factories and other industrial applications.

In its merchandising activities the company was somewhat hampered by its inability to secure low-priced lamps. This was especially evident in IES-lamp promotion (because few Canadian manufacturers offer IES lamps, most of these lamps must be imported from the U.S.) and in its pin-up lamp drive. In this campaign the company could not find any lamp to retail below $3, so it had to make local manufacturing arrangements for a special model at $4.75. Handicapped by price and by the fact that this was its first dealer cooperative effort on portable lamps, the company nevertheless made a creditable showing. Offered were two lamps for $9 and special terms for individual purchase of 45c down and 50c month.

The only other genuine campaign (the company puts its main effort into sustained seasonal promotions) was the fourth annual employees' lamp globe drive. Although no premium was offered, a sales volume of $11,420, representing 47,500 globes, was attained.

Major events of the year included the following: Participation in the Canada Pacific Exhibition at Vancouver and in other expositions; radio and refrigerator shows in all parts of the territory; rural meetings; a five-week electric range essay contest, and three special promotions held in cooperation with the appliance council of the Electrical Service League. The practice of staging regular cooking schools was discontinued in favor of a spring and fall series of homemakers' classes and teas. In order to get selected audiences, special registration was required for these classes. All the uses of electricity in the home were covered.

This year the company will begin to retire slowly from the merchandising of radios, radio tubes, washers, ironers, floor polishers and vacuum cleaners (except, in the last case, for resale lines). Sales efforts will be concentrated on ranges, water heaters and refrigerators. Minor table appliances and lamps will also get their share of attention. Promotion will, however, be distributed over the whole field, including those appliances which are being cut out.

Industrial sales were last year about the same as in 1937. But of ten companies reporting, five look to some increase in 1939 and only one expresses uncertainty. Here is a stereotyping installation made by Southern California Edison for a small newspaper print shop in Lancaster, Calif.

California-Oregon Power

Last year the market conditions for appliances were approximately at the 1934 level. A slight improvement is in sight for 1939. Saturation on ranges and refrigerators will slow down sales except in the replacement market. A 20% increase in water heater sales is forecast.

Only appliance records available for 1938 are on ranges, refrigerators and water heaters.

City of Seattle

During 1938 customer acceptance of IES lamps and light conditioning and automatic tank water heating grew steadily. There was no apartment-house electric-range replacement business, but it is expected that 1939 will be an exceptionally good replacement year.

Success of Seattle City Light in selling ranges and water heaters is due to its intensive promotion methods. Two campaigns were held on each appliance. Heaters were sold at a flat installed price including wiring, plumbing, etc. Ranges were promoted through subsidized wiring, $10 being charged the customer for range wiring, $20 for range and water heater wiring. These savings were extended to dealers.

Idaho Power

Business conditions in Idaho territory were last year below the 1937 level—merchandise sales showed a 19% drop. This year's prospects remain about the same as last year.

Twenty per cent of total appliance sales were made by the company.

Residential rates were reduced from 3c per kw.-hr. to 2.78c. Farm rates were reduced from 2.73c to 2.68c.

Montana Power

Unlike Montana's 1937 crops, which were far below a ten-year average, 1938 crops were well above the average. Metal prices caused a slump in mining activities during 1937-38, but gradual recovery in prices indicates that mining activities early this year will be at about the same level as in the beginning of 1938. Taken as a whole, 1938 was a poorer year in mining activities than 1937.

Street lighting became a very important part of Montana Power Co.'s business last year and promises to hold up this year.

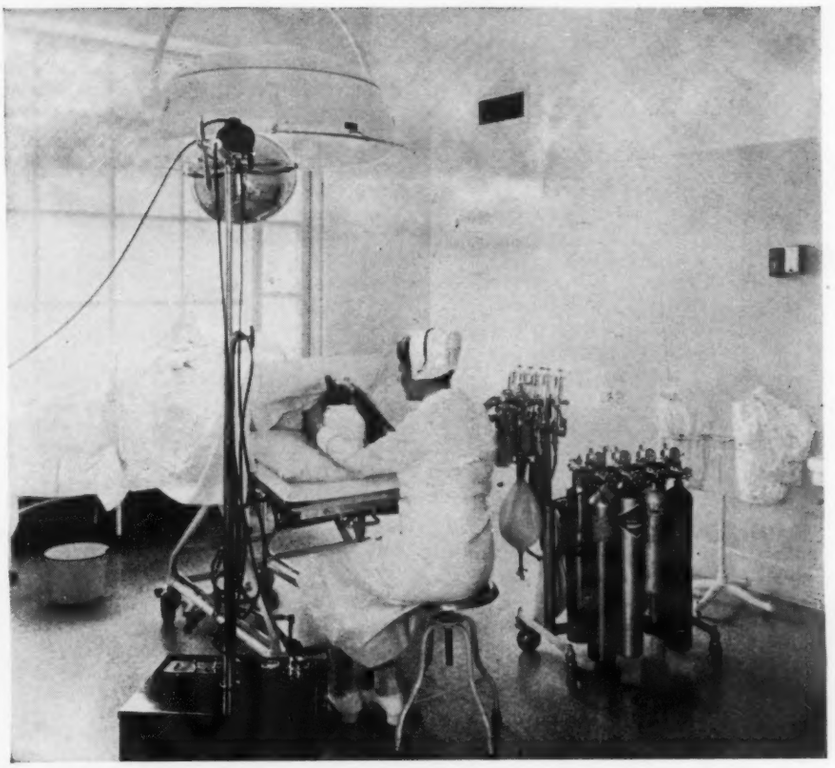
UTILITY-DEALER APPLIANCE SALES

	Total $ vol. co.-dlr. sales (000)	RANGES					WATER HEATERS					REFRIGERATORS					WASHERS				
		1937 co.-dlr. sales	1938 co.-dlr. sales	1939 co.-dlr. sales	% repl. 1938	% sat. 1938	1937 co.-dlr. sales	1938 co.-dlr. sales	1939 co.-dlr. sales	% repl. 1938	% sat. 1938	1937 co.-dlr. sales	1938 co.-dlr. sales	1939 co.-dlr. sales	% repl. 1938	% sat. 1938	1937 co.-dlr. sales	1938 co.-dlr. sales	1939 co.-dlr. sales	% repl. 1938	% sat. 1938
B. C. Electric	2,334	875	929	965	35	13	186	155	90	10	3	1,924	2,241	2,275	2	10	3,539	3,348	3,440	55	46
Calif.-Ore. Power			1,610	2,000	15			970	1,500	10			2,800	3,000	14						
Central Ariz. L. & P.	1,207	306	262	300	10		128	65	100			3,345	2,407	2,400	10		2,545	2,109	2,400	80	
City of Alameda		338	195				110	25				357	209				278	151			
City of Burbank‡		264	290	400			41	65	125												
City of Pasadena		199	175				156	115				2,685	2,100								
City of Seattle		3,036†	2,850	3,200	23	40	2,083†	2,500†	3,050	2	27	681†	3,125	3,500	3	32	312†	200†			
City of Tacoma		750	1,000			34															
El Paso Electric	214†	585	482	325	15	18	275	393	295	18	11	2,365	1,501	1,500	34	63	103	47			
Idaho Power	2,615	4,563	4,274	3,590	25	52	2,288	1,999	1,930	15	22	5,618	4,069	4,430	15	55	3,722	3,500	3,700	50	70
L. A. Bureau‡	11,000	6,256	5,420	7,000	3	4	1,701	1,580	2,000		1.2	36,958	30,300		50	54	20,417	20,000		70	
Montana Power	305†		1,098	1,200	5	20		190	235				5,328	6,870	5	55		5,716	5,500		
Mountain States Pr.		1,481	1,033		16	25	762	398			7.5	1,231	1,753		12	38	490				
Nev.-Calif. Elec.†	300	1,245	450	500	20	26	874	250	300	10	14	2,274	700	500	40	53	1,148	250	200	50	
Northwestern Elec.	2,198	1,574	1,603	1,700	25	40.3	354	417	600	5	6.2	3,199	3,278	3,000	15	51.2	3,342	3,022	3,400	25	66.3
P. G. & E.	25,000	3,289	3,900	3,900	8	8	1,919	2,400	2,400	1	5	41,104	42,000	42,000	10	40	24,265	27,000	27,000	33	55
Pacific P. & L.	2,556	1,678	1,693	1,660	25	17.7	903	1,050	1,130	5	11.2	6,789	5,331	5,414	15	36	6,201	5,207	5,125	40	78.3
Portland G. E.	2,323	3,753	4,112	4,500	27.3	24	1,584	1,316	1,800		7	7,661	6,273	8,000		46	10,905	6,321	6,000		58
Public Service Co., Colo.†	784	772	398		5	5	85	30				1,847	1,362		10	50	1,038	586		25	60
Puget Sound P. & L.	2,855	6,311	4,602	4,950	33.8	26	2,777	1,978	2,350	14.3	11	11,473	9,019	8,500	8.3	30					
San Diego Cons.	3,000	800	650	800			633	600	700			8,625	7,700	7,500			4,325	4,200	4,200		
San Joaquin L. & P.	2,595	1,737	1,447	1,554			901	727	725			8,939	6,852	7,100			8,646	4,251	4,900		
Sierra Pacific Pr.†	675	900	713	800	14.6	53	281	235	250	1	14.7	1,250	971	1,000	3	65.7	1,000	700	800	50	40
Southern Calif. Ed.	12,500	7,305	5,000	5,000	15	9.5	2,663	1,500	2,400	7.5	4	49,396	23,000	30,000	10	60	34,087	25,000	20,000	30	60
Southern Colo. Pr.	475	378	368	395		20	168	176	246		8	2,287	1,701	1,712		31	1,954	1,799	1,898		
Tucson G. E. L. & P.‡	300	148	150	150	5	5	54	50	50	10	2	1,273	1,500	1,500	30	65					
Utah P. & L.	5,163	4,727	2,942	3,950	30	35	1,636	815	1,550	5	5	10,800	7,472	9,800	25	55	10,790	8,668	10,800	75	77
Wash. Water Pr.	3,338	2,151	2,256	2,550	50†	33	1,828	1,591	1,800	10†	23	7,822	6,508	7,150	30		6,151	5,087	5,350	50†	

N. B.: B. C. Electric's saturation figures (not covering Victoria) are based on a survey made in 1933 and kept up-to-date by a check of co.-dlr. sales canceled against replacements. Northwestern Electric's figures are based on a recent survey of 13,808 customers. P. G. & E. made a recent survey of major appliances. Southern California Edison's figures are based on intermittent checks of small areas. Utah Power's figures are reported as 10 mo. actual and 2 mo. estimate. Replacement figures are based on actual figures in the case of larger appliances where trade-ins are accepted. Sierra Pacific Power's figures on saturation and replacements of ranges, water heaters and refrigerators are 10 mo. actual and 2 mo. estimate. Pacific Power & Light's saturation comes from surveys based on 27,835 homes.

	IRONERS					RADIOS					AIR HEATERS					IES LAMPS				
	1937 co.-dlr. sales	1938 co.-dlr. sales	1939 co.-dlr. sales	% repl. 1938	% sat. 1938	1937 co.-dlr. sales	1938 co.-dlr. sales	1939 co.-dlr. sales	% repl. 1938	% sat. 1938	1937 co.-dlr. sales	1938 co.-dlr. sales	1939 co.-dlr. sales	% repl. 1938	% sat. 1938	1937 co.-dlr. sales	1938 co.-dlr. sales	1939 co.-dlr. sales	% repl. 1938	% sat. 1938
B. C. Electric	415	301	310		2.8	11,409	11,732	10,300	80	80	718	551				7,500*	7,500*			
Calif.-Ore. Power																				
Central Ariz. L. & P.	236	173	180			6,997	6,747	6,000	50		547	500	100			5,710	4,872	4,825	50	
City of Alameda	80	50				568	470				367	161				80	100			
City of Burbank																				
City of Pasadena																				
City of Seattle	102†	70†														100†	600†	750†		
City of Tacoma																				
El Paso Electric	41	12														5,500	4,500	4,000		
Idaho Power	432	470		5	10	8,048	6,916	7,070	50	95	866	900		36	35	3,997	4,623	5,020	14	30
L. A. Bureau‡	3,547	4,000		5		28,104	33,500		80		3,677	1,800		5						
Montana Power		719	500				12,598	9,500									7,868**	9,000**		
Mountain States Pr.	105										143									
Nev.-Calif. Elec.†	222	50	100								520	250	250			789	400			
Northwestern Elec.					9.1	7,335	8,266	7,000	25	106.1					10.2	7,153	7,095	7,350		28.6
P. G. & E.	5,688	5,000	5,000	15	6.5	72,096	93,000	93,000	66	96	5,102	5,000	5,000	5		831	900	900		
Pacific P. & L.	730	456	516		6.2	10,614	10,740	9,750	50	91.8						5,976	10,210	7,615		
Portland G. E.	1,177	1,000	1,200		17					95	1,441	1,360	1,800		60	27,964	22,754	25,000		40
Public Service Co., Colo.†	236	110			7	2,597	894		80	80	233	144		15		4,200	7,020			30
Puget Sound P. & L.																26,000‡	23,000‡	20,000‡		
San Diego Cons.	835	725	800			12,625	12,500	12,000			2,000	1,800	2,200			6,000				
San Joaquin L. & P.	1,474	671	1,300			13,360	8,309	8,600			847	1,002	1,410			3,642	4,374	6,500		
Sierra Pacific Pr.‡	250	175	200		7.5	3,000	1,500	2,000	90	80	150	75	100			500	500	700		
Southern Calif. Ed	6,356	3,200	3,000		4	58,342	50,000	50,000	48	90	3,473	1,400	2,000			22,315†	17,650†	23,000†		
Southern Colo. Pr.	149	128	166													1,073	1,076	1,464		5
Tucson G., E. L. & P.																				
Utah P. & L.	725	607	689	20	1	16,634	16,561	18,700	75	100	1,473	1,044	987	75	6	12,107	10,475	18,600	30	39
Wash. Water Pr.						14,476	16,659	15,000	70‡							14,475	15,619	17,000	70	

*Not all indirect lamps sold carried IES tags. ‡Dealers only. **Listed as "portable" lamps. †Company only.



Air conditioning has not yet developed into our next huge industry. But gradually people are learning the benefits it offers (see table, two pages over). This is a Carrier installation in the San Antonio Community Hospital at Upland, Calif. Because of a special humidifier which maintains a relative humidity of 55% in the operating room, surgery has become much safer and the hospital has been given a higher rating by doctors

Mountain States Power

Sizable increase in the number of Mountain States Power Co.'s domestic customers was the result of a reclassification under state and federal rulings. Heretofore, water-heater users were not counted as separate accounts. The reclassification, however, added 3,000 water-heater customers to the records. This is the reason for the drop in kw.-hr. consumption from 1,156 to 1,137. If the change had been ignored, the kw.-hr. consumption would have been 1,214 for 1938.

Although the company discontinued merchandising in January 1938, it cooperated closely with dealers in promoting ranges, refrigerators, etc. Assisted by the EH&FA, it also made available a finance plan to dealers.

Best promotional results were obtained through small, invitational prospect schools held with all dealers throughout the year. Maximum attendance per meeting was 25 or 30 persons. Many sales were traced to these schools.

This year's merchandising program will be about the same as last year's. Service on dealers' appliances will be furnished on a cost basis. Many campaigns and special promotions will be held. Newspaper advertising, direct-mail promotion and window display services will be used to attract customers to dealers' stores.

Nevada-California Electric

Because its salesmen's territory is too large, Nevada-California Electric Corp. follows no particular lighting program other than a general educational plan of calls, particularly to schools. Results last year were very satisfactory, however, and give an optimistic outlook for 1939.

Generally speaking, the mining and industrial outlook is uncertain. Last year's outstanding load was a dredge constructed and artificially floated in Manhattan Gulch, Nev., by Manhattan Gold Dredging Co. The connected load is about 2,100 h.p. and the service period is estimated at 8 years. Water for the pond is pumped through a 14-in., 7-mi., welded-steel pipe-line.

Northwestern Electric

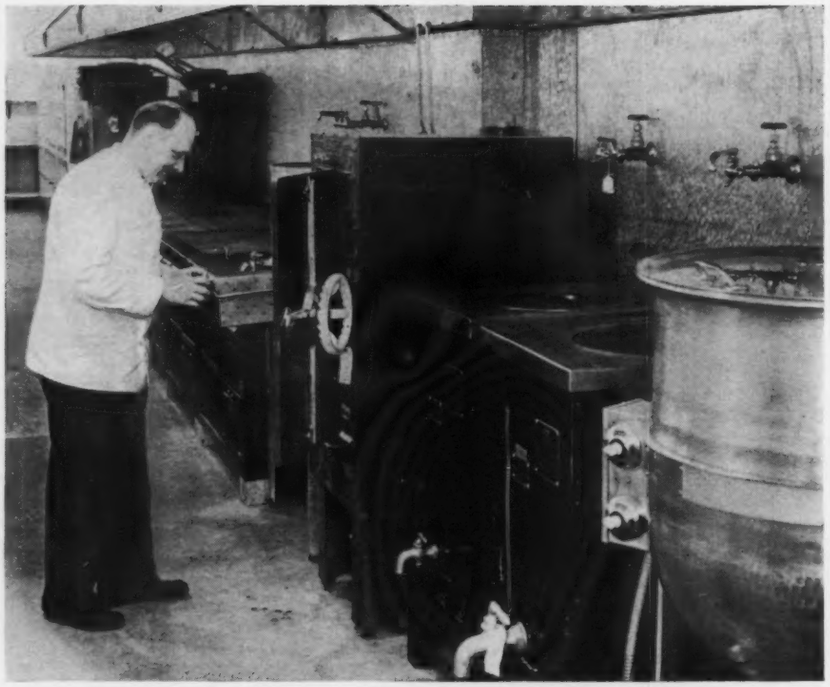
The series of cooking schools conducted in districts served by Northwestern Electric Co. enjoyed the best attendance of any similar schools ever held by the company. Many of the local dealers who cooperated showed direct sales as a result.

Portland G. E.

Statistics of local retail sales indicate that the volume last year was about 11% under 1937. Building permits for the first ten months of the year were only 70% of the total for

Utilities are slowly retiring from the merchandising business. As a result, they feel the need of holding more and more training classes for dealers. Even if they don't stop merchandising, they hold classes. Witness this one held by British Columbia Electric Railway in Vancouver

*Not all indirect lamps sold carried 1938 tags. †Dealers only. **Listed as "portable" lamps. ‡Company only.



Commercial cooking load continued to develop slowly in 1938. No actual figures were given by reporting companies, but the NWEL&PA announces that Northwest utilities added 10,605 kw. of connected cooking load in the first ten months. Here is part of the huge job at the now famed Hollywood (Calif.) Turf Club

the same period of 1937. Despite these sorry figures, Portland General Electric Co. expects some increase at least in the industrial field in 1939.

Three salesmen last year added approximately 1,000 kw. of lighting load estimated to produce annual revenue of $25,000. This year the company will send three or more lighting specialists into the field.

All the company's offices except that in Portland ceased the sale of appliances early in 1938. In October, after having previously cut its sales organization in half, the Portland office closed its doors. Despite this action, dealers' efforts accounted for an increase in range sales over 1937.

Public Service of Colorado

Last year conditions in agricultural areas were adversely affected by low prices for crops. This year, however, Public Service Co. of Colorado looks for an increase in building activity which should bring about considerable improvement in general business throughout the area. Further growth is expected in both mining and industrial building, which means that the company will connect about the same amount of new load as in 1938.

Outstanding industrial installation last year was the complete electrification of one coal mine with a load of 1,200 h.p. This mine was formerly served by a private plant.

The company's methods of selling IES lamps are among the best practiced by any Western utility. Last year it organized a domestic lighting department consisting of 22 outside salesmen, two supervisors and a superintendent. Each salesman is assigned a protected territory, and each supervisor is assigned 11 salesmen.

The salesmen work on a house-to-house canvassing approach in an effort to sell not merely lighting equipment but light conditioning. They are expected to demonstrate enough equipment to light properly the living room and all other rooms in the house. They leave the equipment in the home for two days and make a light-conditioning demonstration at night when they have an opportunity to talk with both the husband and wife.

This operation is set up on the basis of a continuous activity during the 12 months of the year rather than on the basis of 60-day lamp campaigns conducted semi-annually.

The salesmen carry the lighting equipment in their cars and take care of all deliveries. The average IES lamp sold runs around $15. All equipment is sold complete with Mazda lamp globes and can be purchased on a monthly payment plan.

After a one-year trial, the company is able to report that this method of selling results in satisfactory sales for itself and has produced a nice volume of lamp business for Denver dealers

Rural sales were quiet last year, but prospects for 1939 are brighter. Many new kinds of installations and equipment have been developed and should make this prediction true. Despite the '38 silence, 12,767 new rural customers were added by reporting power companies

PRINT IN BINDING

COMMERCIAL AND INDUSTRIAL SALES

	Commercial Lighting		Industrial Lighting		Domestic Lighting		Fluorescent	Air Conditioning Installations					Agricultural Load		Increased Load—Kw.						
	1938 added kw.	1939 added kw.	1938 added kw.	1939 added kw.	1938 added kw.	1939 added kw.	Are you promoting?	Attic Fans	Evaporative Coolers	Refrigeration but no heat	Including heat	Other types	Developed in 1938—kw.	New load—kw.	1938 Industrial	1939 Industrial	1938 Oil Field	1939 Oil Field	1938 Mining	1939 Mining	
G. Electric	3,587	3,484			457	600	Yes								6,000	Same					Com. & Ind. lighting combined
Calif.-Ore. Pr.	1,000	Same					Yes	50	35												Com. & Ind. lighting combined.
Central Ariz. L. & P.									1,817	30	15										
City of Pasadena							Yes														
City of Seattle					Good		Yes								4,400						
El Paso Electric	601						Yes		1,346	7				472	1,350						Com. & Ind. lighting combined—90% was Com.
Idaho Power	1,680	1,440													1,111						
L. A. Bureau, P. & L.								2	6	60		2			57,000						Lighting sales below 1937. 1938 Ind. load covers total power load, including Com. power.
Montana Power	Satis.	Incr.					Yes						425			Incr.		Incr.		Incr.	
Nev.-Cal. Elec.	Satis.	Incr.						110	1,700	78	29	225 65		970	4,070	Uncer.			2,450	Uncer.	Air conditioning figures combined.
Northwestern Elec.	1,436		142				Limited					3			3,500	Same					
P. G. & E.	($405)	Same		Same	($90)	Same	Yes	($25)					($213)		($1,163)	Incr.		Incr.		Incr.	Figures in parentheses denote E. A. R. in $000. All are combined.
Pacific P. & L.	($69)		($8)					6													Lighting figures in parentheses denote E. A. R. in $000. Farm equipment sales produced $17,440 E. A. R.
Portland G. E.	1,000						Yes								1,500	Incr.					Lighting figures combined.
Public Service Co., Colo.								4	39	3	2		900	850 149	4,480	Same			6,710	Same	
Puget Sound P. & L.	2,700						Yes				6					Incr.				Incr.	Com. & Ind. lighting combined
San Diego Cons.		Same								2											Estimated new farm consumption was 1,325,560 kw.-hr. Merchants are lighting conscious; schools lack funds.
San Joaquin L. & P.	1,900	Incr.			1,104	Same		50	2,500	60	25	10	7,240	6,340	7,624	Incr.	5,712	Incr.	672	Incr.	Com. & Ind. lighting combined.
Sierra-Pacific Pr.											10								1,000	None	
Southern Calif. Ed.	Good	Incr.	Good	Incr.		Incr.	Yes	40	190	80	15			9,540	7,195		3,512				
Southern Colo. Pr.								2	10												
Tucson G. E. L. & P.									1,200	35				800							
Utah P. & L.	3,232		451	500					66	44	1	129	674		5,800	Same			3,760	Same	
Wash. Water Pr.	($100)	($145)			($163)	($168)									13,000				11,000		Figures in parentheses denote E. A. R. in $000.

who handle IES lamps and other good equipment.

Puget Sound P. & L.

In line with its old policy, Puget Power's appliance sales were last year confined to ranges, refrigerators and water heaters. However, it was active in promoting dealer sales of all popular appliances.

This promotion took the form of cooperative newspaper advertising, radio publicity, participation in fairs and other shows, educational home building exhibitions, cooking schools for dealers and sales training of dealer personnel in groups at their places of business.

Outstanding campaign was the "Span of Life" letter-writing contest designed to develop the wider use of appliances by telling the health story of all appliances.

As a further cooperative dealer service and benefit to customers, arrangements were made whereby the company was appointed fiscal agent for the EH&FA. This low-cost financing service to dealers was also extended to contractors for modernization of wiring.

In addition to holding customary homemakers' meetings, etc., the company's home service department carried out a plan of following up all range and refrigerator sales with an instruction call on the buyers. A kitchen planning department turned out over 150 plans for all-electric kitchens.

Equally busy was the farm electrification department, which exhibited at various fairs, conducted 65 field demonstrations on farms and took part in 36 farm meetings. Principal new agricultural application was the development of an egg cooler and humidor now being tried out at the State Experiment Station but not yet in general use.

Improved business conditions are expected this year.

San Joaquin L. & P.

Domestic lighting results were last year excellent. Four home lighting advisors were working full time. The supervisor held a full program of talks before homemaking classes, women's clubs, farm bureaus, etc. The company (now known as the San Joaquin Power Division of Pacific Gas and Electric Co.) expects to continue promotion of both commercial and domestic lighting in 1939 along the same general lines as last year. Another commercial lighting salesman may be added.

Some slight improvement is expected in industrial, oil field and mining sales.

Sierra Pacific Power

Appliance sales last year were well under 1937 figures. Refrigerators were particularly hard hit. Although there is little chance of 1939's being better than 1937, it will be some better than 1938. No new industrial or mining load is in sight.

Sierra Pacific Power Co. does not merchandise, and dealers in the territory are opposed to campaigns.

One man is employed by the company to specialize on lighting in an advisory or engineering capacity. His services are very much in demand, and beyond an occasional memorandum the company does not waste his time with clerical routine about calls, load or increased revenue.

Southern California Edison

Most significant trend in Southern California Edison Co.'s territory is the

HOW APPLIANCES ARE SOLD

	DEALERS			1938 CAMPAIGNS AND RESULTANT SALES												SPECIAL EVENTS					IES LAMP PROMOTION METHODS																
	Department stores, etc., handling major appliances	Other stores handling major appliances	Handling appliances on side	Range	Range Sales	Water Heater	Water Heater Sales	Refrigerator	Refrigerator Sales	Washer-Ironer	Washer-Ironer Sales	Roasters	Lamp Globe	Lighting	Other	Shows	Exhibits	Homemakers' classes, etc.	Contests, trailers	Demonstrations, etc.	Newspaper advertisements	Radio advertisements	Direct mail	Home demonstrations	House-to-house selling	Direct sale	Billboards	Exhibits, demonstrations	Lighting schools	Service department activities	Sight-testing booths	Cooperative dealer sales	Free home trials	All-employee selling	Special campaigns	Contests	Sales resulting from special promotion
Albuquerque G. & L.	10	2	3										1	1		x	x	x	x		x						x		x						x	
B. C. Electric	16	68	39																		x															
Calif.-Ore. Power	14		46																																	
Central Ariz. L. & P.	31	28	42															x			x			x								x				
City of Alameda	1	1	2																		x															
City of Burbank	6	2	2																																	
City of Pasadena	4	14	4																													x				
City of Seattle		50		2	899	2	1,560										x	x			x			x												
City of Tacoma																																				
Coast Counties G. & E.																										x				x						
El Paso Electric	3	3	17	2	337	2	255	2	298			1		1				2			x	x											x				1,600
Idaho	57	142	50	4	3,271	4	1,688			1	323		1	1																x				x		
L. A. Bureau P. & L.	19	290	50	3		3									1	3			x	x	x		x		x											
Montana Power	195	33	228	1	325			1	644							x		x			x					x										
Mountain States Pr.	18	45	15	x		x		x													x					x										
Nev.-Calif. Elec.				1	200			1	143							x		6																		
Northwestern Elec.	36	28	85															x			x											x				
P. G. & E.	20	380	800													x	x				x					x										
Pacific P. & L.	78	38	273													23					x					x						x				
Portland G. E.	66	138	608	2		1																		x												
Pub. Service Co., Colo.								1		1					1	x		x						x	x							x				
Puget Sound P. & L.	58	225	154	6		6		6								x	x	x	x	x	x	x		x					x	x		x		x	x	18,000
San Diego Cons.	37	153	310							2						3				x						x										
San Joaquin L. & P.	30	126	8	x		x						1			1			x		x	x									x				x		
Sierra Pacific Pr.	10	28	4																		x						x									
Southern Calif. Ed.			387*									1			1	x		35	x		x	x				x										
Southern Colo. Pr.	6	26		1		1		1	166									x			x			x												
Tucson G. E. L. & P.	7	14																			x															
Utah P. & L.	65	66	377	4	2,046	3	657	1	42	1	79		1	1	4		x		x							x						x				
Wash. Water Pr.	65	50	25	1	1,626	1	1,183										x	x			x			x		x						x				3,500

*Total.

acceleration in home-building. By the end of this year, the company should add at least 25,000 new homes in its system.

Lighting sales in 1938 were highly satisfactory. Plans for 1939 include a possible addition to the commercial sales staff. The company is promoting fluorescent lighting, but it may be forced to require power-factor corrective equipment.

Utah P. & L.

Among the many campaigns held last year by Utah Power & Light Co., probably the most successful was the "Silver Platter" range campaign in which prospects were asked to write essays on the subject, "Why I would like an electric range." A total of 8,291 essays were submitted. Sales made from these prospects were 823 ranges.

In the agricultural field, the company made several new applications: an electric potato cooker for cull potatoes fed to pigs; a heater for whey fed to livestock; a dog-kennel heater; a new type drinking-water warmer, and a small hammer-mill feed grinder.

Largest industrial installation was made for Utah Ice & Storage, Salt Lake City. This was a 247.5-kw. refrigeration job. This year's industrial prospects are about the same as 1938, though they are largely dependent on the metal-mining market.

Last year the company reduced and simplified its residential rate schedule.

Northern California Society

Two territory-wide campaigns and the San Jose ironer test plan were the three major accomplishments of the Electric Appliance Society of Northern California last year.

First campaign, held in May, was on refrigerators. Slogan was "An Electric Refrigerator Pays for Itself and Then Pays You." Object was to have all retail outlets tell at the same time a specific and identical story. This story (which supplanted the claims each dealer would ordinarily make for his particular line of refrigerators) was a recital of figures taken from a national survey. "Average savings of refrigerator owners are 68c weekly by preventing food losses, 50c weekly by buying food bargain specials, 62c weekly by buying in large quantities, 73c weekly by reducing cost of refrigeration."

Advertising in support of the campaign included a series of four ads in approximately 250 newspapers, 225 radio spot announcements, billboards, dealer display sets, counter cards, billstickers, etc.

Total sales for the month of May were 5,710 refrigerators. June figure was 5,356.

Second campaign was on electrical Christmas gifts. Departing from the usual type of Christmas advertising, the society showed Santa Claus as a football cheer leader. Slogan was "Score With Santa! Electrical Gifts Win!"

The society's San Jose test plan on ironers (ELECTRICAL WEST, December) attracted widespread interest as one of the first constructive plans to sell more ironers. Although results were not spectacular, sales during the plan's four-months' duration showed an increase over the same period in 1937.

The plan, in modified form, will be extended throughout northern California this year. Inauguration date is Feb. 15. Two or three months later a check-

up will be made to improve on the plan's operations and to determine its future course. In all likelihood, a major ironer campaign will be held in September.

Widening of the plan is necessitated by the fact that advertising and sales policies of some small-town stores are handled in centers like San Francisco. Furthermore, last year San Jose dealers were disinclined to advertise the increased ironer prices when dealers in other nearby cities were not affected by the plan.

Under the new program, dealers will raise the price of all ironers $5 instead of $10. Two instead of three lessons will be given purchasers in the use of the ironers.

As a special activity during December, the society sponsored the annual campaign of the Outdoor Christmas Tree Assn. of California. More than 300 chambers of commerce, and several hundred civic, business and women's clubs and newspapers cooperated.

Another special activity was the holding of a course for experienced electric appliance salesmen. The work was conducted by Ferris M. Wakeley and consisted of five classes—two in San Francisco, one in Berkeley and two in Oakland.

Five classes in these cities will be enrolled again this year, and the course will be extended to other cities.

Other 1939 activities are the same as those in 1938.

RMEL

Three accomplishments high-spotted the Rocky Mountain Electrical League's work last year. They were: subsidization of local leagues; an intensive IES-lamp campaign, and the Christmas expositions.

Subsidization of local leagues was started when RMEL directors decided further to increase the percentage of dealer sales. The subsidization took the form of pro-rated distribution of funds among active leagues. This financial aid was made on the ratio of the number of electric customers in the local league's territory to the total number of customers in all the communities served by the local leagues.

The IES-lamp campaign, which reached its climax in December, was responsible for the sale of over 20,000 lamps by utilities and dealers. Sales of all outlets practically doubled before Christmas. Surprisingly enough, in spite of the fact that several power companies abandoned merchandising, power company lamp sales exceeded dealer sales.

To promote this campaign, the league sponsored a light-conditioning essay and picture contest, advertised extensively, etc.

Generally speaking, all league activities pointed toward the Christmas appliance shows. This was well justified in view of the new attendance records which were established.

Other league activities included spring expositions in Albuquerque, N. M.; Rawlins and Casper, Wyo., and Denver; tie-ins with all national campaigns, particularly the adequate wiring drive; garden-lighting promotion, and Christmas-lighting promotion.

Plans for 1939 call for still further expansion. The league will cooperate with the Modern Kitchen Bureau, Ade-

EFFORTS AND ACCOMPLISHMENTS OF UTILITY SALESMEN

	COMMERCIAL CUSTOMERS	AVERAGE ANNUAL CONSUMPTION		COMMERCIAL LIGHTING SALESMEN						OTHER COMMERCIAL SALESMEN						INDUSTRIAL LIGHTING SALESMEN						OTHER INDUSTRIAL SALESMEN						COMBINATION SALESMEN					
	Number	Commercial customers	Industrial customers	Number of salesmen	Customers per salesman	Jobs closed per salesman	Average kw. per job	Average kw. added per salesman	Average number calls per job	Number of salesmen	Customers per salesman	Jobs closed per salesman	Average kw. per job	Average kw. added per salesman	Average number calls per job	Number of salesmen	Customers per salesman	Jobs closed per salesman	Average kw. per job	Average kw. added per salesman	Average number calls per job	Number of salesmen	Customers per salesman	Jobs closed per salesman	Average kw. per job	Average kw. added per salesman	Average number calls per job	Number of salesmen	Customers per salesman	Jobs closed per salesman	Average kw. per job	Average kw. added per salesman	Average number calls per job
Albuquerque G. & E.	1,700	4,250																													
B. C. Electric	18,400	3,932	59,724	1	3,400	75	2.5	188	12	1*	600		642								3*	850		2,000			6†	3,000				
Calif.-Ore. Pr.	6,146	3,988	182,780	3	2,000	100	3	325	10																						
City of Alameda	962																														
City of Pasadena	3,457	5,744	377,000																												
City of Seattle	15,000	4,162		2	5,000	118	1.5	180																							
City of Tacoma				1						5																	6					
Coast Counties G. & E.	3,470	2,900	855																								6	600	27	117	312	
El Paso Electric	3,217	6,850	355,000																								7	1,115			740	
Idaho Power	5,702	6,000	59,450																												
L. A. Bureau, P. & L.	82,440	6,775‡	92,000																												
Montana Power	10,767	4,734	618,641																								14	846				
Mountain States Pr.	8,475	2,310	21,000																								7	1,000				
Nev.-Cal. Elec.	4,900	4,736	90,670	2#	2,500	75	8.5	625	6																						
Northwestern Elec.	4,750	9,500		5	760	135	1.7	227	11	1	300	79	4.2	330	13	2	300	23	3.2	90	9	3**	300	58	12.5	724	9	4					
P. G. & E.	105,500	5,000	22,100																								76					
Pacific P. & L.	8,025	5,502	94,200																								11	730				
Portland G. E.	13,893			3						6												4					1					
Public Service Co., Colo.	15,260	3,817	32,665																												
Puget Sound P. & L.	22,900	9,388	41,772																								13	1,810	108	5.9	66	10
San Diego Cons.	13,360	4,040	12,000	2		300	1	300	4																						
San Joaquin L. & P.	14,500††	3,550††		5	2,000	95	4	380	9																						
Sierra Pacific Pr.	2,000	10,200	238,000																								1	2,000				
Southern Calif. Ed.	56,000	3,200	23,000	20	2,400	150	2.7	420	10							2	2,400	150	2.7	420	10						1	2,400	100	2.7	420	10
Southern Colo. Pr.	3,055	2,428	10,000	1						11																					
Tucson G. E. L. & P.	1,650	11,804																													
Utah P. & L.	10,344	5,979	238,266							17	560	228	1.8	332	6							7	206	56	18.9	881	14					
Wash. Water Pr.	8,500	9,123	560,398	12‡‡	760	221	2	461	6							1‡‡	610	85	10	850	11											

†Principally lighting. *Listed as power salesmen. ‡Average consumption of commercial power customers is 11,600.
#Includes industrial lighting figures. **These men sell light, heat and power. ††Lighting. ‡‡All-purpose salesmen.

quate Wiring Bureau and other affiliates of the Edison Electric Institute in the promotion of ranges, refrigerators, roasters, etc. As a result of negotiations which it began last year, it will boost a national outdoor lighting contest. Numerous major cities are expected to participate in this drive to light homes at Christmas-time and thus increase sales of lamps.

San Diego Bureau

While advertising and promotional budgets were being pared by many organizations, the Bureau of Radio & Electrical Appliances last year increased its budget. Due in part to this aggression, appliance sales were well above the national average.

Losses were registered by radios (1%), refrigerators (11%), ranges (19%), water heaters, (6%), washers (2%), ironers (13%) and such small appliances as mixers, waffle irons, etc. Gains were registered by vacuum cleaners (8%), sewing machines (10%) and toasters, coffee makers, hot plates, etc.

Contributing to this success was an intensive refrigerator and laundry equipment advertising campaign; the "Amateur Ironers' Institute," which attracted 10,000 visitors and caused 3.010 persons actually to take ironer lessons; the second annual Spring Fair, which set a new attendance record of 78,000; the "Radio Referendum," in which people were directed to dealers' stores in large numbers, interest in new models was created and important facts about radio-listeners' program preferences were gained; the sixth annual Electrical Show, which drew 102,000 persons. The bureau also succeeded in getting the City of San Diego to include in its budget sufficient money to pay for the salary and equipment of a full-time officer to enforce the radio interference ordinance.

Plans and prospects for 1939 are good, according to J. Clark Chamberlain, bureau manager. He reports: "Business may be inclined to slump a bit during the early months of the year, but we feel any loss will be regained later on. We believe 1939 will be an excellent year for appliances in general. Radios and refrigerators are not expected to exceed last year's very satisfactory figures, but there should be little change. A definite increase is looked for in ranges, water heaters, roasters, vacuum cleaners and certain table appliances. The general average should be up over 1939. As for our bureau activities, we can only say that 1939 will be the most aggressive year on record, with more appliance promotions than ever before scheduled."

Supplementing this report, San Diego Consolidated Gas & Electric Co. (which pays for the bureau's advertising) says that San Diego merchants last year became lighting conscious to the extent that the company was kept busy on direct requests. Only a few schools relighted, lack of funds holding back the others. If business conditions improve, it is expected that merchants will materially increase their lighting installations this year. Possibly the company will take on another lighting salesman.

Southern California League

Since its beginning in 1935, the Electrical Development League of Southern California each year has enlarged its program and increased the scope of its activities. This growth will be further stimulated in 1939 by even larger expenditures. Past programs will be continued and new ones added. No phase of industry development will be overlooked.

Adequate wiring remains the chief interest of the league. New plans call for intensive work with architects, builders and electrical contractors. Large meetings have already been held. A specification service, confined to single residential structures, is being established for the use of all interested parties.

To stimulate relighting and wiring of old factories, offices and stores, the league will conduct a campaign in cooperation with all branches of the NECA to bring up-to-date these outmoded conditions. A man will be added to the payroll to supervise this activity.

A definite strengthening of retail dealers through education, sales promotion and salesmen training will be undertaken. Dealer conferences will be continued. Operations of the salesmen's clearing house will be made more inclusive. For the first time, the league will work with colleges and schools to attract new young men into the selling end of the industry. It will place men in the field to work directly with dealer members.

The Electrical Maintenance Engineers' Assn. will hold lighting forums and educational courses in addition to the regular monthly informative meetings.

A league speakers' bureau will be formed. Object is to help all clubs, etc., to find authorative speakers. It is felt that such an activity will not only provide a real service but will also promote interest in the industry.

Acceptance and administration of the national adequate wiring program highlighted last year's work. Adequate wiring classes were held for the benefit of all kinds of people. The first annual Electrical Industry Conference was held. The series of contractor meetings culminated in a wiring rally. Frequent wiring exhibits were set up, and reams of advertising, publicity and direct-mail promotional material were sent out. Certification of homes was at the rate of about 25 per month. Twenty-eight member utility salesmen were trained to contact every home-builder in the league's territory.

In its retail promotion work, the league held 44 dealer conferences. It assisted in forming the Southern California Retail Electrical Assn. The salesmen's clearing house was estab-

lished. Efforts of the local washer and ironer group were coordinated.

The maintenance engineers increased their membership to a new high of 460. Special courses were held on lighting, practical electricity, motors and control equipment and photo-electric cells.

League and league-sponsored industry participation effected the promotion of adequate wiring, lighting and major appliances in four major shows with a combined attendance of over 250,000 persons.

Utah League

Among the many utilities and organizations which are pushing adequate wiring for all it is worth is the Electrical League of Utah. Last year (see December ELECTRICAL WEST) it besieged prospective home-builders, architects, building contractors and real estate men with numerous letters and promotion pieces pointing out the value of good wiring; it certified a large number of homes, and it demonstrated wiring materials and methods so effectively during Salt Lake's "Own Your Own Home" week that it practically stole the show.

Plans for 1939 have not yet been completed, but it is safe to say that this campaign will continue unabated.

Already the league has participated in two of Utah Power & Light's home service radio programs. In these, Elias J. Strong, league manager, answered wiring questions posed by Miss Nancy Finch, head of the utility's home service department. These questions had been asked by women Miss Finch contacted in her travels throughout the utility's territory.

One other promotional effort the league has decided on is a display of the various wiring methods—house wiring with armored cable, knob and tube and non-metallic sheathed cable, etc. Different types of lighting fixtures, switches, outlets, electrical accessories and an all-electric kitchen are also exhibited in a small cottage constructed in the First Security Bank, one of the largest home-building sponsors in the state.

One of the most magnificent Christmas spectacles in the world is presented each year by Madrid, N. M., an obscure mining community of less than 1,000 persons. So fine is the display—which last year represented to Albuquerque Gas & Electric Co. a load of about 500 kw.—that people from all over the country flock into the town. Preparation for the show begins in the latter part of October. Each Sunday the miners give up their whole day to completing the job on time. Electricity is furnished without charge by the mine owners. All other expenses are paid from the fund raised by voluntary pay-roll deductions. Many thousands of dollars are represented in the equipment used. Herewith are three pictures of 1938's display. Topping the crest of one of the hills overlooking the valley in which the town is situated, you come upon a myriad of lighted homes (above). High up on the side of one hill is a reconstructed City of Bethlehem (opposite page). Nearby appear the life-like figures of the wise men approaching the manger (left). Other displays include a gigantic electric cross; shepherds with their flocks; the Sphinx and three pyramids, and, in the town itself a brightly lighted toyland

Future Campaigns

More about what the utilities are doing to boost sales

Following are the utility-dealer campaigns which have been scheduled up to and including April:

B. C. Electric Railway Co.—March, kitchen-modernizing campaign. This is to be backed up by a General Electric magic kitchen dis-

play. April, range and water-heater campaigns and a refrigerator show.

Colorado Central Power Co.—February, campaigns on washers, ironers and irons.

Denver Electrical League—February and March, campaigns on IES lamps, roasters, commercial lighting, adequate wiring and small appliances.

Mesilla Valley Electric Co., Las Vegas, N. M.—February, IES-lamp clearance; March, general clearance and refrigerator campaign.

Montana Power Co.—March, laundry campaign. As usual, the company will advertise to "see your dealer." April, range campaign.

Mountain States Power Co., Casper, Wyo.—February, washer and ironer campaign; March, special refrigerator week.

Nevada-California Electric Corp.—March and April, range campaign.

New Mexico Public Utilities Corp.—February, G-E lamp campaign; March, adequate-wiring and electric-kitchen campaigns.

Portland General Electric Co.—March, water-heating campaign; April, range and water-heating campaign.

Public Service Co. of Colorado—February and March, campaigns on IES lamps, washers, ironers and cleaners.

Puget Sound Power & Light Co.—March and April, range and water-heater campaigns.

San Diego Bureau of Radio & Electrical Appliances—March, laundry-equipment campaign; April, refrigeration campaign.

Sheridan County (Wyo.) Electric Co.—February, waffle-iron campaign.

Southern Colorado Power Co.—March and April, campaigns on ranges, refrigerators and irons.

"The oven light spoils my reading—snapping on and off!"

Southwestern Public Service Co., Roswell, N. M.—February and March, light-conditioning campaign. Carlsbad, N. M.—February, cleaner campaign.

Trinidad (Colo.) Electric Transmission, Railway & Gas Co.—February, adequate-wiring and range campaigns. The company will cooperate in refrigerator and range displays.

Utah Power & Light Co.—March, campaigns on ironers, space heaters and washers; April, campaigns on refrigerators, space heaters and commercial water heating.

Valley Electrical Supply Co., Fresno, Calif.—February, range campaign.

Western Public Service Co.—February, campaigns on cleaners and kitchen-lighting units.

APPLIANCE SALES REPORT, 1939

A Summary of Dealer and Utility Reports Compiled by Associations, Societies, Bureaus, or Dealer Contact Departments of Utilities

REPORTING COMPANIES	Idaho Power Co.[1]		L. A. Bureau of P. & Lt.[2]		Montana Power Co.[3]		P. G. & E. Co.[4]		San Diego Cons. G. & E. Corp.[5]		San Joaquin Lt. & P. Corp.[6]		Southern Calif. Edison Co., Ltd.[7]		Utah Power & Lt. Co.[8]		Wash. Water Power Co.[9]
	Current	12 Mos.	Current	12 Mos.	††Current	12 Mos	*Current	*11Mos.	Current	12 Mos.	Current	12 Mos.	†Current	†12Mos	Current	11 Mos	Current
Ranges	258	4,475	379	4,722	1,098		334	3,722	50	588	136	1,447			297	2,942	
Water Heaters	137	2,103	86	1,406	199		229	2,382	55	575	84	725			71	815	
Air Heaters, aux.	165	615	249	1,337			1,473	5,499	475	1,870	83	400			240	1,044	
Air Heaters, 220			111	624	309		157	882			50	417					
Refrigerators	144	4,105	1,672	30,518	5,328		2,134	37,930	400	7,675	93	4,713			289	7,472	
Dishwashers			15	227			14	196			3	61				30	
Washers	252	3,641	1,627	19,901	5,716		2,378	26,873	350	4,185	182	2,974			743	8,668	
Ironers	38	400	344	4,048	719		548	5,185	75	705	49	680			96	607	
Vacuum Cleaners	80	918	526	6,071	2,695		2,200	22,278	400	2,880	87	955			578	4,106	
Radios	1,392	7,823	4,546	35,276	12,598		14,684	100,549	1,750	11,525	816	5,806			3,141	16,561	
Mixers	424	892	794	2,559			613	3,751	750	2,220	236	685			563	2,014	
Cookers, Casseroles	69	301	239	1,220					250	1,095	97	579			160	987	
Irons	848	4,831	1,058	7,762					675	2,475	398	3,602			1,486	11,566	
Waffle Irons	591	1,595	1,028	3 555							361	1,197			1,111	3,986	
Toasters	929	2,476							1,000	4,740	384	1,723			949	4,654	
Table Stoves	337	2,048	740	2,683	12,823				300	1,210	182	1,087			1,450	8,114	
Heating Pads	375	853	639	1,854					600	1,805	154	544			556	2,292	
Curling Irons															154	1,900	
Coffee Makers	728	2,341	863	1,931					800	4,780	360	1,588			861	5,609	
Sewing Machines	19	123					458	5,084	200	1,200					360	2,013	
Clocks	634	1,508	804	3,265					1,500	5,200	458	1,947			884	3,492	
Fans	41	1,144	36	1,255							1	1,637			18	1,046	
Floor Polishers															13	87	
Sun Lamps	34	123													4,374	15,898	
Reflector Lamps	994	3,968			9,653						678	2,438			4,441	26,192	
Miscellaneous Lamps	1,049	4,448															
Yard Lights											44	623					
Misc. Small Appl.			440	3,051					2,000	8,050	220	1,231					

SOURCES

[1] Figures compiled by Electric Equipment Sales Association. Include power company sales of all reporting dealers.

[2] Compiled by Los Angeles Bureau of Power and Light for territory served by that system.

[3] Combined dealer and company sales from report of Montana Power Co. ‡ Does not include dealer figures for two divisions for January and February, 1938.

[4] P. G. & E. reports sales of major appliances only based on accurate reports from dealers' accounts. Ranges, water heaters and air heaters include company and dealer sales. *Due to delays in compiling report current and total figures are always one month behind those figures of companies reported in other columns of this table.

[5] Gathered by Bureau of Radio and Electric Appliances of San Diego County. Estimated monthly sales figures used in this table: Miscellaneous figures includes fans, curling irons and sun lamps.

[6] Includes dealer reports from Midland Counties Public Service Corporation also. Compiled by Valley Electrical Supply Company.

[7] Includes reports from dealers on San Joaqin Valley system of company as well as Southern California areas served.

[8] Includes Utah Power & Light Company territory in Utah, Idaho and Wyoming. Also Western Colorado Power Company territory.

[9] Dealer sales only for Spokane and company territory. Company sales not included. Table stoves, grills included with cookers.

† December figures were not available at time of going to press.

†† December figures not reported by company.

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No. 2-c FEBRUARY, 1939

Electrical West

Sales Guide

Everybody Eats—

and what they eat is cooked—that's why ranges are a necessity to your prospect, and an opportunity to you

as a Dealer

Ever stop to think why it's good business to sell electric ranges—put lots of effort into selling them?

Here's why—

1. **More of your gross profits stays with you.** After delivery, the power company usually takes care of service for you. Service costs eat into your net. With electric range selling, your **net** is larger.

2. Selling an electric range gives you **a chance to follow up with other appliances.** It gives you leads for all-electric kitchens and home laundries—in one big order.

3. **Both manufacturer and utility carry the heavy load of advertising and promotion.** You can follow up under their barrage. They break the Sales resistance for you.

4. The sale is of real importance and value to your customer. It is **a chance to build a lifelong customer** and a booster for you, if treated right.

5. There are hundreds of old fuel ranges in your town being replaced every year. The electric range is coming into its own. It is tomorrow's way to cook. **It is easier to sell.**

6. **Electric ranges are year 'round articles.** They balance off the seasonal appliances such as refrigerators, floor lamps, etc.

As a dealer you have plenty of good money-making reasons to go after electric range sales.

as a Dealer Salesman—

You'll get real satisfaction out of making electric range sales.

At first glance it sometimes appears difficult. There is stiff and persistent competition to meet. And it tries to beat you with a lower price.

More and more, though, national ads and good articles in women's magazines are interesting women in the electric way to cook.

It is making them willing to pay more for a cleaner, more modern, a longer lived and more trouble-free way to prepare meals. They like the idea of the time it gives them, and feel safer in its automatic operation when they are away from home.

Selling them is a matter of building up these superior advantages in terms of what they mean to the user.

Range sales bring you more income. They are good business for the firm. They improve your standing and commissions.

It is worth your while to read and use what's inside—

What Electric ranges mean to You

What to Say

Just One Word

Electric Cookery is MATCHLESS

That's easy to keep in mind. Make every letter of the word stand for a selling point. Explain it this way to each prospect and close more sales

MODERN—it is tomorrow's way to cook. Five years ago one electric range sold to every 10 for other fuels; last year one electric to each three of other kinds. All other types try to imitate electric range appearance and performance; more reason for buying electic now instead.

ACCURATE—Cooks with identical results time after time; keeps the heat under your absolute control. ATTRACTIVE, too, it makes any kitchen look smart, inviting.

TIME-RELEASING — More time to yourself; the automatic timer starts, watches and stops cooking your meal for you, reliably.

CLEAN—clean pots and pans, clean kitchen, clean air, a range easy to keep clean itself; clean drapes, walls, too.

HEALTHFUL — Produces better looking, tasting, digesting food. Preserves delicate vitamins better; retains minerals and flavor.

STAMP OF APPROVAL

Recommended by Your

THE MONTANA POWER CO. • UTAH POWER & LIGHT CO.
IDAHO POWER CO. • CALIFORNIA OREGON POWER CO.
ROCKY MOUNTAIN ELECTRICAL LEAGUE

to Remember—

LABOR SAVING—Because it cooks accurately, is easy to clean, easy to use, an electric range saves time and labor. Oven meals save preparation time. Accuracy saves pot watching. Cleanliness saves housework. Electric ranges are LONGER LASTING, too, because of the way they utilize heat.

ECONOMICAL—In more than just fuel. Much cooking is done coasting, with electricity off. You save in food shrinkage, in ability to cook cheaper cuts appetizingly. Reduces housekeeping costs because it is clean. Brings you down on the "wholesale" part of the electric rate for economy.

SPEEDY—Just as fast as any fuel with new speed units. After full heat is reached, it cooks on stored heat. SIMPLE—Even a child can operate it. Get bests results every time. Oven turns itself on and off. Nothing to get out of order. No complications to remember. It's dependable, too.

SAFE—With complete peace of mind you can go away and leave it to cook a meal, or allow children to operate it. Healthier for family, pets, house plants. SUMMER cooking is more pleasant because it is cooler with electricity. The heat is directed to the food and not wasted heating up the room.

To meet competition—

or to overcome sales resistances, overbalance them with the **advantages** of clean electric cooking, **prove** the advantages by describing the features of your range, and tactfully **ask for the order.** If you get further resistance, ask questions to smoke out the real reasons, then apply the **advantages** that meet that difficulty, throw in a reminder of several other advantages for good measure, and ask again for the order. Selling, after all, is a process of eliminating doubts and fears. Substitute advantages for them and you satisfy the prospect that it is all right to buy.

to

Make the most

of nationwide interest

Sell

Electrical Ranges

Sales Allies —

PUGET SOUND POWER & LIGHT CO.
PORTLAND GENERAL ELECTRIC CO.
WASHINGTON WATER POWER CO.•

What to do—

Just a Few Questions

to refresh your memory and help you check up so you can do the things that make for success and save your time

1 How's your STOCK?

Have you models on hand for immediate delivery — a model for floor display—for the window a feature model—one connected up for demonstration? Have you ordered display material and sales helps?

2 How about DELIVERIES?

Are you set up right to uncrate, inspect, clean up, and deliver the range? Why not put some **showmanship** into delivering a range so that the neighbors will notice and come to see it. Prospects are easily made by that kind of advertising.

3 How about DISPLAY?

Are your ranges placed where traffic is heavy? How is your window for displaying a feature model? Are you using banners and cards identifying you with the campaign? Are the ranges inside given a good display?

4 Ready to DEMONSTRATE

Is a model connected up somewhere in the store for cooking demonstration? Have you an electric kitchen or a place at one side where the prospect can be taken for a demonstration away from interruptions?

5 How about WIRING?

Do you know of any special wiring deal the utility may offer? Ask and find out. If there is none, tie up with a good contractor to take good care of this end of the deal.

TIE-IN—Modern Kitchen Bureau will run a nationwide campaign on ranges. Make it work for you by using tie-in material

6 Remember the KITCHEN

It pays to lay the foundation for the all-electric kitchen. Sometimes it may surprise you and turn up a complete sale right away. In any case it paves the way to follow up a customer for the water heater the electric sink, mixer, lighting, and appliances. Make use of the idea that an electric range is independent of a chimney and that later remodeling of the kitchen can place it anywhere to arrange kitchen tasks more conveniently. This has a strong appeal to many women who like to remodel and rearrange their homes. No other range offers this advantage. Plumbing, piping and flues usually fix the position of other types of range. Show some of the tricky kitchen arrangements where a range is used in the center of a kitchen, providing a social corner or space in the kitchen for eating, sewing or informal visiting.

7 How ADVERTISE?

Are you ready to cash in on the utility and national ads by telling local people WHERE to buy? When the utility runs general ads, tell features of the range you carry. Might as well make that advertising help **you.**

8 RECIPES and such?

Best kind of a follow-up of users to get names of prospects is to bring them recipes, ideas on cooking, new gadgets. It builds friends and they advertise you by word-of-mouth, and furnish prospect names. This thoughtfulness pays dividends.

9 COMPETITION worry you?

Other fuel ranges are desperately trying to hold their business against the growing demand for electric ranges. That's a good selling point in itself. Almost every gadget and feature of electric ranges is being copied, but its performance can't be. Don't waste time knocking the other kinds. Keep selling the advantages of electric cooking, its superiorities, its cleanliness and **healthfulness.** Remember a customer lost to competition who later tells neighbors she wishes she had bought your range, because you did a fine selling job, will create other sales for you.

—and How

1939 Activities

Of the Modern Kitchen Bureau include five campaigns

Five activities for 1939 were announced last month by the Modern Kitchen Bureau. They are: A year-round all-electric kitchen program and campaigns on the range, water heater, refrigerator and roaster.

Theme of the range campaign will be "Guess Again — Electric Cooking Costs One-Half as Much as You Think." The water heater campaign will offer $3,000 in cash prizes to utilities and to utility and dealer representatives. A prize of $1,000 will go to the utility doing the best all-round job of promotion. There will also be special contests and prizes for local newspaper campaigns, window displays and letters from retail salesmen on "How I Sell Electric Water Heaters."

A newcomer to the bureau's program is the roaster. Backbone of the campaign will be a series of national advertisements running throughout the year.

The refrigerator and all-electric kitchen drives will offer a series of selling ideas and promotional materials.

All campaigns will be backed by extensive national advertising, direct-mail folders, window banners, counter cards, newspaper ads, radio spot announcements, etc.

Year's Value

How W. O. Johnson overcomes price-objections in selling washers

W. O. Johnson, of Johnson's Maytag Store, McMinnville, Ore., has evolved an effective plan for the presentation of sales arguments on major appliances. He does not simply pick out individual sales features and explain them one by one. He goes further, first explaining the feature, then setting a year's service value on it.

This service value is an arbitrary one, but low enough so that the prospect readily agrees that the feature is worth that much to her. Johnson thereby employs that established principle of selling which calls for a "yes" to a question.

Take a washing machine for example. Actually the method can be used for any appliance. But it was for washers that Johnson first worked out the plan. Later he applied it to all the other major appliances he carries.

Let's therefore get down on our knees with Johnson and see how he

Let's get down on our knees with W. O. Johnson and sell a high-priced washer

sells a washer. That's what he does: starts at the floor with the caster.

His particular caster has an exceptionally large wheel on easy-running bearings. He explains this and what a difference it makes in moving the heavy machine. He has the prospect try it for herself. Then he says:

"Mrs. Jones, you are going to wash 52 times a year and move the machine several times at each washing. Consider this 'free wheeling.' Wouldn't this feature be worth $1 a year to you?"

Without hesitation she agrees that it would.

Another talking point about the caster is its adjustability in height over a considerable range. The question follows: "Mrs. Jones, since you can adjust all the casters so that the machine will conform to your height and you will not have to stoop when washing, and since all of them may be adjusted individually so that the machine will stand level on a basement floor that slopes to the drain, wouldn't this feature be worth $2 a year to you?" She says it would.

So he goes on with other features, getting a $1-a-year appraisal on this, $2-a-year on that. Because the prospect must get the washer out 52 times a year, all these appraisals seem relatively insignificant. But after the demonstration, Johnson sums up five of the features as follows:

Large wheel on caster	$1 a yr.
Adjustable caster	$2 a yr.
Drain hose	$1 a yr.
Hinged lid	$2 a yr.
Sediment zone	$2 a yr.
TOTAL	$8 a yr.

Now comes the clincher to the argument: "Mrs. Jones, the life of a washing machine cannot be foretold exactly, since so much depends on the amount of use. Some of ours still give good service after 20 years. Perhaps makers of other types of machines can point to equally good records. So let's put it low. Say the life of a machine is ten years. Here are five exclusive features of this one which you have said yourself would be worth a total of $8 a year to you. In ten years time, then, they amount to $80. Take $80 off the price of this machine and wouldn't that bring it down to a pretty low-priced machine after all?"

"Yes," she says.

Of course it should be pointed out that the washer Johnson handles is higher priced than most, and he first employed this selling method to off-set price resistance. The plan, however, may also be used on appliances in the lower-priced brackets in order to show how they will pay for themselves over a period of time.

Sheet Music

And how it builds traffic for a Victoria appliance store

Many're the music shops which, to the chagrin of electrical appliance dealers, have invaded the appliance field. Few are the appliance stores which have reversed the process by invading the music field.

One of the few is Nixon's, Ltd., Victoria, B. C. Established in 1931, when T. M. Nixon and Herbert Clarke joined forces in the electrical contracting business, Nixon's has since grown steadily. Early last year the firm opened a modern store on Yates St.; now it has moved to larger quarters at 1205 Douglas St. Sheet music has been largely responsible for this almost phenomenal growth.

T. M. Nixon says that sheet music and small musical instruments have worked in extensively with the appliance business (which the company soon went into). He points out that appliances, in themselves, do not draw people into a store daily as do groceries. Maintenance of a good stock of sheet music, with special emphasis on the latest popular hits, however, has provided this drawing power.

Since music has been included in the store stock, traffic has been stimulated. This, in turn, has enabled the salesmen to contact customers and to create a desire for electrical appliances. Effective display of merchandise has also aided.

To make the attraction of the music department, located on the main floor, still stronger, Nixon's has employed two prominent local musicians. They are Frank Tupman, conductor, who is in charge of the department, and Miss Phyllis Mugford, his assistant.

ELECTRICAL WEST

The All-Industry Magazine of Progress

Established 1887 and Incorporating the "Electrical Journal," "Journal of Electricity, Power & Gas" and "Journal of Electricity"

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883 Mission Street, San Francisco

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Too Many Local Cooks

IN DISCUSSING the complexity of the European scene a recent speaker figuratively transposed the map of Europe on the Western states in order to emphasize the racial, lingual, monetary and tariff barriers which provoke misunderstandings and impede commerce and trade. He pointed out that the equivalent of such a simple business trip as from Los Angeles to Seattle, with the normal stop-overs, would involve six changes in language and money, seven passport visas, upwards of a dozen clearances through customs and immigration authorities and innumerable other exasperating inconveniences.

This is an analogous parallel to the situation which is developing in the marketing of electric ranges and water heaters. Because of the increasing multiplicity of local "policies," "specifications" and "restrictions" the market for these appliances faces the threat of being stifled and the stage is being set for potential misunderstanding. By demanding the incorporation of "pet ideas" into range and water heater specifications and then restricting the sale or installation to only those which comply, those in the industry who are fostering this program are circumscribing the market, preventing standardization, increasing manufacturing costs and forcing producers to quote higher prices. As proof of the need for standardization one need only cite the water heater situation—one major manufacturer is required to build more than 600 models to meet "local" specifications, another more than 800.

Such policies are equivalent to the erection of definite tariff barriers between various regions of the country. Because of them it is conceivable that an appliance manufactured to meet specifications laid down in California could not be sold in Wisconsin or Pennsylvania and vice versa. Carried to extremes it is possible that the number of models of appliances required would ultimately be proportional to the personal and individual opinions of people in various communities multiplied by the number of localities where such restrictions might be imposed. Obviously this would wreck both the range and water heater manufacturing industry or else the resulting high prices would preclude any possibility of selling these appliances to the public.

There was a period when manufacturers of equipment and apparatus used in the distribution of electric power were confronted with a similar situation. Not only did utility engineers demand "special" equipment to meet their particular ideas and theories, but even packaging requirements differed. This problem was solved by industry group discussions which had as their basic function simplification and standardization with the knowledge that accomplishment of these aims would result in lower costs and ultimately in lower rates.

Something similar should be done in the case of ranges and water heaters before the situation gets out of hand. Otherwise the fundamental economic philosophy which has built the American standard of living—namely, more things for more people at constantly lowering prices—will be defeated and a great market jeopardized.

Credit Where Credit Is Due

HUMAN relations is a doctrine that can be applied internally as well as externally by various units in the electrical industry. Before good customer or public relations can be developed, it is essential that there be an enthusiastic, loyal, inspired and energetic internal organization. The building of competent people qualified to do their job courteously, conscientiously and capably is thus an important problem. It is one which cannot be left to chance.

One certain way of assuring that an organization will perform efficiently and smoothly is to see that credit goes where credit is due. The man who bosses a group of workers, whether he be a foreman with a gang of five or six or an executive with hundreds of people under him, can make or break employee relations by ignoring or by giving full consideration to the incentive for recognition. If

he "hogs the credit" instead of recognizing a good job and passing the word along, he destroys the morale of the people under him. If he gives personal consideration to their good work and sees that his people receive credit for their ideas, he inspires loyalty and builds confidence. A supplemental benefit will be the stimulation of new ideas and worthwhile plans for further progress. An executive who built both a great business and a fine organization once said:

"No man can expect to become a great executive if he is afraid to be overshadowed by a competent specialized subordinate. The executive who picks a more able man than himself to work under him is the greater for his success in bringing such a man under his direction."

Safety in Numbers

SUPPOSE the whole electric business were going to collapse and vanish five and a half months hence. If a set of figures were collected, indicating a trend which forecast that event, you'd be a little better off. You'd start looking for another job. You'd start retrenching. You'd start plotting a course of action. You'd be preparing for the probable future as indicated by such facts as you could isolate today.

The facts tell no such story. The trend they indicate is quite the other way. There is a high degree of probability in the statement that ten years from now the electric business, here in the West, will be operating on a scale which, judged by the standards of today, seems astonishingly big.

Does such a prospect mean that you will plunge into the future in blissful ignorance of the facts? There are real opportunities ahead and just as good reason for you to prepare for that kind of future as for the disaster supposed above. Take a look, then, at the figures assembled in this review. They were put there to help you gain security by planning for the future in the light of fact.

A New Manifest Destiny

"MANIFEST DESTINY" was a phrase that had much to do with the winning of the West. With the passing of the last frontier it became merely a memory, mentioned occasionally in history books. Today the West has a new destiny—industrialization of a great empire endowed with incomparable natural resources of timber, oil, minerals, soil, climate, fisheries, transportation facilities and last and perhaps foremost—electric power.

Within a month there will be available a sales manual which will provide the basis for an intelligent and comprehensive program of industrial development. This will be an exhaustive factual report on the resources, the markets, the trade balances, the present degree of development and all of the other factors which influence or invite new industries. The report is being compiled by Industrial West, Inc., a non-profit cooperative organization which was set up to produce the basic information to be used in one of the outstanding exhibits of the GGIE—a huge relief map of all of the 11 Western states.

This industrial report will be a boon to the electrical industry. That the utilities appreciated its need is demonstrated by the fact that both privately and publicly owned power companies financed it by self-assessment. The efficacy of the report will be measured by the degree to which it is put to use. Because of its stake in the development which the report portends, the industry should take the leadership in the large-scale promotional work which the West needs to assure any kind of industrial destiny.

The Wishing Well

IT IS wishing time again. The legislatures of California and Oregon are in session and so is Congress at Washington. The number of wishes, expressed in terms of bills that have been tossed into the legislative lotteries, exceeds all known highs. The last hours of the session literally snow bills and pile them up in drifts.

Greatest danger from them lies in their tremendous volume. Even the wary will weary of examining them to know which to oppose, which to support. In such a snowstorm of bills too many may drift through and pass.

The wishful philosophy that characterizes so many of these bills is a rebuke to the self-reliance of a country that once bred pioneers. Bills asking government alms that would have shamed past generations are presented unblushingly and even with a defiant assumption that these demands are "rights." Boot-strap lifting has become not the indication of softened brains it was once regarded, but a seriously taken economic theory.

While the wishing is good, it is devoutly to be wished that common sense will melt down some of this snowstorm of legislation. The year 1939 shows enough promise of stimulated business to reawaken hope and initiate activity again. From these realistic things—business, enterprise, daring, promotion—come real jobs, real income, and incidentally the ability to pay taxes. Wishes and borrowing against tomorrow do not create new wealth, no matter how humanitarian the motive. It is to be hoped that the drifts of wishful bills will not chill this promise of real activity and real jobs and real income that 1939 holds forth.

Come Out, Come Out Wherever You Are!

By HERBERT METZ

DEAR John Doe or Richard Roe or Mr. Harrison:

Your "Consumers Aren't Suckers" article in the December issue of ELECTRICAL WEST was very interesting. It was addressed to the electrical industry, and while I don't pretend to be the electrical industry or represent it in whole or in tiny part, I have been so interested in this adequate wiring campaign that I feel I'd like to reply to you individually.

Old Timer, you certainly laid it on and there's a lot in what you say, but you seem to be somewhat uninformed. Now, honestly, did you look at any of the material we've developed to educate the public about adequate wiring? Did you look over the Plan Book? Have you any idea of the objectives behind the plan and the means we are taking to reach them? Or did you read this one ad, get mad and grab your typewriter and let us have it? Tsst, tsst—bet you're a nice fellow, too!

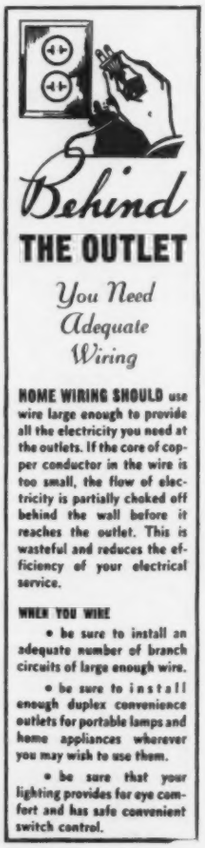
Now, then, I'm not going to take your article to pieces because the editor wouldn't give me the necessary space, so we'll make this just a general reply—a sort of man-to-man talk.

Let's begin with your underlying implication that the "ad" you illustrate and castigate is "bad advertising." I've been in this advertising business for 25 years and if I've learned one thing in that time it is that I don't know if an ad is good or bad until I am told what results it brought. The Townsend boys are doing quite well back here telling advertisers whether the ads they plan to run are good or bad and you must know that their advertising prognostications are given to the accompaniment of Bronx cheers, cat calls and wild yells of derision, and also considerable acclaim and plaudits. I'm not critical of the Townsend Plan. I'm just telling you that even experts can't get together on calling ads good or bad before they're run. You say the ad is bad. I say it's "bad" only if I know how few people got any *impression* of adequate wiring from it.

You're right — adequate wiring is complicated and confusing to the layman. And I for one don't believe that any ad or series of ads will ever make Mr. and Mrs. John Q. Public go right out and buy some adequate wiring as they buy razors, or soup or toothpaste.

We who are developing plans, programs and advertising to promote adequate wiring realize with you that this is a program of education, and like all educational programs it is going to take time to put it across. We realize, also, that the material to be used must be written in language people understand. We've tried to produce just that sort of material and I'm sorry you haven't had a chance to see it.

For instance, there's the "Pictorial Primer." This is a book which, as the name indicates, is designed to tell folks what adequate is and why it is so essential to the modern home. Anyone who can read, I believe, will understand it.


Behind
THE OUTLET
You Need Adequate Wiring
HOME WIRING SHOULD use wire large enough to provide all the electricity you need at the outlets. If the core of copper conductor in the wire is too small, the flow of electricity is partially choked off behind the wall before it reaches the outlet. This is wasteful and reduces the efficiency of your electrical service.
WHEN YOU WIRE
• be sure to install an adequate number of branch circuits of large enough wire.
• be sure to install enough duplex convenience outlets for portable lamps and home appliances wherever you may wish to use them.
• be sure that your lighting provides for eye comfort and has safe convenient switch control.

Typical Adequate Wiring Bureau Ad

Then there's a special little folder that tells about good results from adequate wiring, and in four simply written paragraphs gives four points and descriptive details of adequate wiring. Just plain ABC language.

And then there's a simple folder that helps Mr. and Mrs. John Q. Public check their wiring to see if it is or is not adequate.

And a flock of stuffers, in single-syllable language that is easy to look at and read.

And a whole folder of newspaper ads, all making a complicated subject pretty simple, if you ask me. For instance, I'm looking at one ad that shows a guy holding a hose from which a tiny stream of water is trickling. "What, no pressure?" he asks—and then the copy points out the analogy between plenty of pressure—plenty of pipe; plenty of electrical current—plenty of wire. Catch on?

And so on and on. Really, Mister, we think your premise is right and we think we're working along the right lines. Won't you take another look at all our stuff and let us know?

In the meantime, we are getting out a lot of new material. We think it's good. We think you'll think so, too. It's all absurdly simple stuff pointing out what a sucker (no, that's your word, isn't it?); pointing out how foolish people are who swing their arms wildly in dark rooms trying to find the cord to pull on the light. And how appliances without outlets to hook 'em into aren't much better than no appliances at all. And how electric irons that don't get hot because the wire is too small are not only aggravating but wasteful. And all this, as I say, in simple language and cartoons. You'll love it! We'll be glad to send samples to you if you send us your name and address.

Frankly, we think we're going places—we see progress in the year behind us and success in the year ahead. As I said, it's going to take time and a lot of work and a united industry back of it all. We think we have that and so we're driving ahead confidently.

Now, and finally, you say "Consumers aren't suckers"—you're right as rain—and, honestly, I don't believe the electrical industry is either.

Thanks for the publicity!

LINCOLN

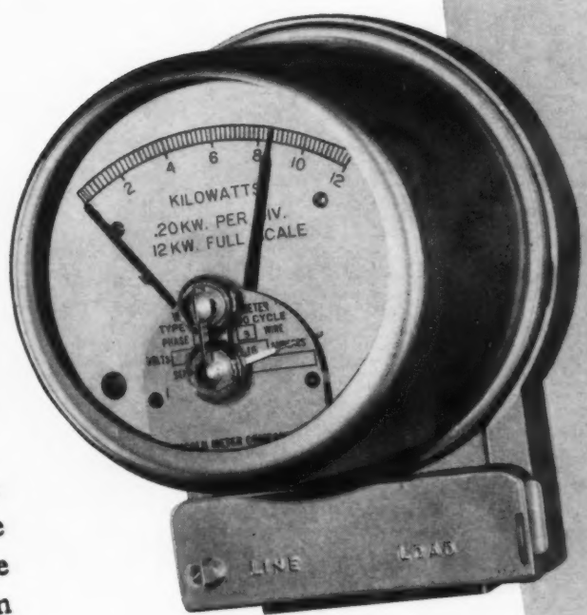
POLYPHASE WATT DEMAND METERS

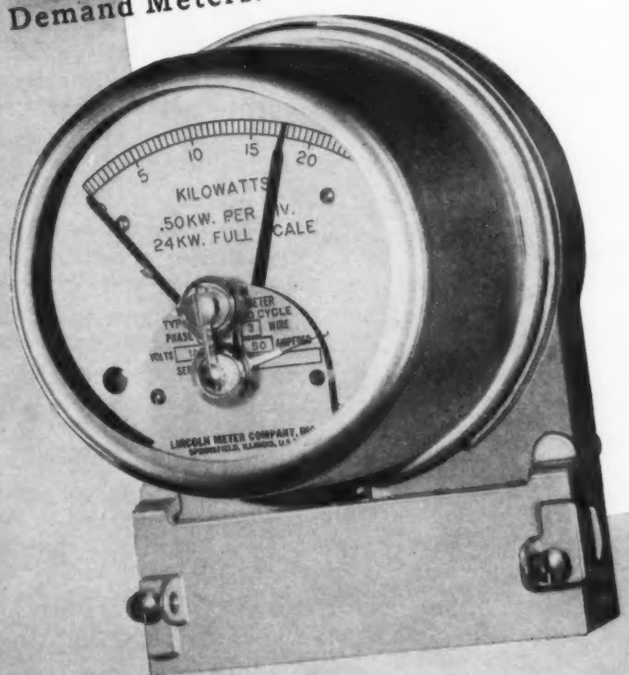
IN MODERN STANDARD WATTHOUR METER

"A" AND "P" BASES

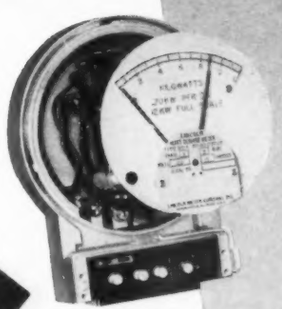
The latest in base, terminal block, and cover design, just as used in the most up-to-date watthour meters, is now available in the new, improved Lincoln Types WDA and WDP Watt Demand Meters. Supplied in three capacities, 5, 15, and 50 amperes for either indoor or outdoor use, these meters provide a complete line of 2 element meters for 3 wire from network; 3 phase, 3 wire, and 3 phase, 4 wire Wye and Delta circuits.

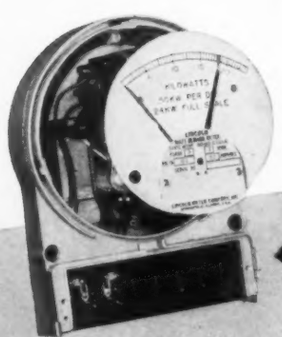
In Lincoln Demand Meters only one unit moves—and that very slowly. There can be no wear in years of service. For trouble-free installations specify "Lincoln Maximum Demand Meters."





The "A" base provides 4 current and 2 potential terminals.





The "P" base provides a maximum of 8 current and 7 potential terminals.

LINCOLN METER COMPANY

SPRINGFIELD, ILLINOIS

WHY

838 POWER COMPANIES • LARGE AND SMALL •

ARE USING C·S·P

FOR DETAILS AND PROOF
Ask any Westinghouse office for full details — how power companies all over the country are saving money with C·S·P TRANSFORMERS.

HERE ARE THEIR REASONS

When over 800 of America's power companies adopt a new piece of equipment, you can be sure there is no guesswork about it. You can be sure that C·S·P's Distribution Transformers have proved themselves, both in the laboratory and on the pole.

SAVING NO. 1

Up to $7.50 saved on every installation

. . . simply because there is less equipment to install. One self-contained package instead of separate transformer, arresters, fuse cutouts, fuses.

SAVING NO. 2

Fuse outages 100% less

There are no fuses in C·S·P, so there can be no fuse outages. Best available records show that fuse outages average from 5% to 10% for conventional transformers.

SAVING NO. 3

Maintenance cost reduced

Compare the cost of replacing damaged arresters, fuses, cutouts, or an entire transformer with simply reclosing of the C·S·P breaker. That's why C·S·P's cost less to keep in service.

SAVING NO. 4

Service Maintained

Because burnouts are less, service is maintained, which means better satisfied customers and more continuous income.

SAVING NO. 5

No Load-Survey Needed

Indicating light shows at a glance — from the ground — when the transformer is overloaded. In effect, here is a FREE load survey.

SAVING NO. 6

A Service record that speaks for itself

C·S·P's in service have reliably performed all the functions for which they were designed. These include:

Complete self-protection against lightning

Complete self-protection against burnouts from overloads

Complete self-protection against burnouts from short circuits

Complete self-protection against service interruptions from fuse outages.

Compare this record with your own knowledge of the performance of conventional transformers.

Investigate the proved advantages of C·S·P. The experience of 838 power companies is a safe buying guide for you. With C·S·P you will save money and increase profits.

J-70188

Westinghouse Transformers

The Simple Job

Is the profitable job if you stress its advertising value

Any alert contractor can develop plus business by selling light as an advertising medium to a wide variety of small businesses. Two excellent examples are cited by the fighting staff of the Los Angeles Bureau of Power & Light. In both cases the contractor did a modest job at a fair price and a good profit and used the installation to sell more similar jobs.

First example is the floodlighting of the real estate office of D. C. Dunn, Inc. A single 1,000-watt floodlight was mounted in front of the building on an inconspicuous pole of conduit. Three 200-watt angle sign reflectors illuminate the billboard next to the office.

In the daytime, Dunn's is just one of a hundred other real estate offices. But at night it is one that stands out. (Though the interesting thing is that since he does not keep open nights, Dunn uses the light only for advertising.)

Since the job was completed, four more have been sold. All the contractor did was point out that the price Dunn's paid for illumination was less than a four-line ad in local newspapers and the prospects became immediate purchasers.

Second example of a job that produced extra business was the lighting of the Old Hickory Tavern by Andrews Electric Co.

The tavern is a typical small white eating house of cottage style. On each side are parking lots for patrons. At the rear of these lots are white board fences bearing "stop-and-eat" signs.

Inasmuch as the property is close to an apartment house, tenants of which would have complained about any "spilled" light, floodlights were not the thing to use to brighten up the tavern. Andrews Electric did the entire job with 60 angle sign reflectors, lamped with 150- and 200-watt lamps, extended straight out from the roof of the tavern and from the top of the fences.

Both of these installations are extremely simple. But the contractors made money on them—and still more money when they sold other jobs to jealous real estate men and restaurant managers.

All of which goes to prove one thing: It isn't always the tricky or unusual job that is profitable. More likely it is the comparatively easy job requiring only standard materials and sound judgment.

Plain Hoss Sense
+ good basic quality
+ up-to-date design
= SUPERIOR
REG. U.S. PAT. OFF.
★ ★ PRODUCTS
THE SUPERIOR SWITCHBOARD & DEVICES CO.
CANTON, OHIO
★ Manufacturing ★
METER & RELAY TEST SWITCHES
METER & TRANSFORMER ENCLOSURES
METER TEST BLOCKS & TABLES

ARE YOU MOVING?

If so, remember that the post office does not forward magazines. Notify Circulation Dept., ELECTRICAL WEST, 883 Mission St., San Francisco, of your change of address.

Stocks at San Francisco
Electrical Specialty Co., Inc.,
316 Eleventh Street

Stocks at Los Angeles
Electrical Specialty Co. of So. Calif.,
451 South San Pedro Street

Stocks at Seattle
Electrical Specialty Co., Inc.,
714 Fourth Avenue

For the Coast Trade

At your doorstep you now have an adequate stock of popular D-H alloys, wires, ribbons, rods and other forms.

Driver-Harris Company
Harrison, N. J.

NICHROME

Electrolysis For The Maintenance Man

By R. D. COON

IT MAY sound elementary to many maintenance men and it may seem remote to others, but the truth is that modern industrial plants are using more and more electrochemical processes. Many of these processes depend upon electrolysis to break down solutions of certain combinations of metals in order to free other elements or to obtain pure metals or gases. Others use electro-plating in large-scale mass-production operations.

While text books do furnish the physical background information upon which these processes are based, the practical plant maintenance engineer should have a good general knowledge of the principles and the operation data pertaining to electrolysis. I experience this need every day. Consequently I have gathered together considerable information from texts and technical articles and a lot more from personal experience and written this article for whatever it may be worth to other maintenance men.

To begin at the beginning, electrolysis is a chemical decomposition by the action of electric current.

When a direct current passes through a chemical compound, either in solution or fused, and the voltage exceeds a certain minimum, decomposition will take place and the composing elements will be set free at the two poles, or new combinations will be formed with or at the electrodes.

Liquids divide themselves into three classes: those which conduct current without decomposition (as liquid metals); those which do not conduct current; those which decompose under the influence of current (as electrolytes). Water is almost a non-conductor, yet it is readily decomposed when in the presence of an electrolyte.

Providing a certain minimum voltage is exceeded, the amount of any given substance that is set free is proportional to the time and amperage passed through the electrolyte. This quantity is not altered by the combination in which the substance exists, providing the valence is not changed. Thus, .01976 grams of copper will be deposited if 1 amp. passes through a cupric salt for 1 min.

These electrochemical equivalents are proportional to the atomic weight divided by the valence.

The electric current causes such a minor chemical change in some solids that it is neglected in all but laboratory tests. In liquids, however, the only part the electric current takes is to ionize the liquid and cause the ions and cations to migrate to their respective electrodes.

By Faraday, it requires 96,494 coulombs to deposit 1 gram equivalent of any metal. (If the heat of formation is known in calories, the decomposition voltage can be found by this formula: Voltage equals 4.2 watts times calories divided by 96,494 valence.) This is the minimum decomposition voltage. However, 100% efficiency is never reached in practical work.

Before the voltage can be determined for any given process, the electrode elements must be determined, because some elements have a higher over-voltage in solution than others. This must be taken into consideration for each individual process—for instance, where insoluble electrodes are used. If copper is to be refined by electrolysis, the positive electrolyte would have to be an element of a higher voltage than copper—iron, nickel or lead. The electrolyte has to be taken into consideration also, as some will dissolve completely and others will not.

The reasons for this, as given by the Faraday Society in 1916, are: (1) The formation of a surface gas film; (2) the formation of an oxide film; (3) conversion of the surface metal into an allotropic modification of which the electrolytic solution is low; (4) the velocity of ionization or hydration of the ion is retarded.

There are several systems of refining. All operations may be carried on either by "multiple" or "series" arrangements. In the multiple arrangement, all the anodes and cathodes of each tank are connected to their respective busbars. In the series arrangement, only one anode and one cathode are connected to the busbars, or source of current. There can be as many plates in series as one pleases to use until the resistance becomes too high.

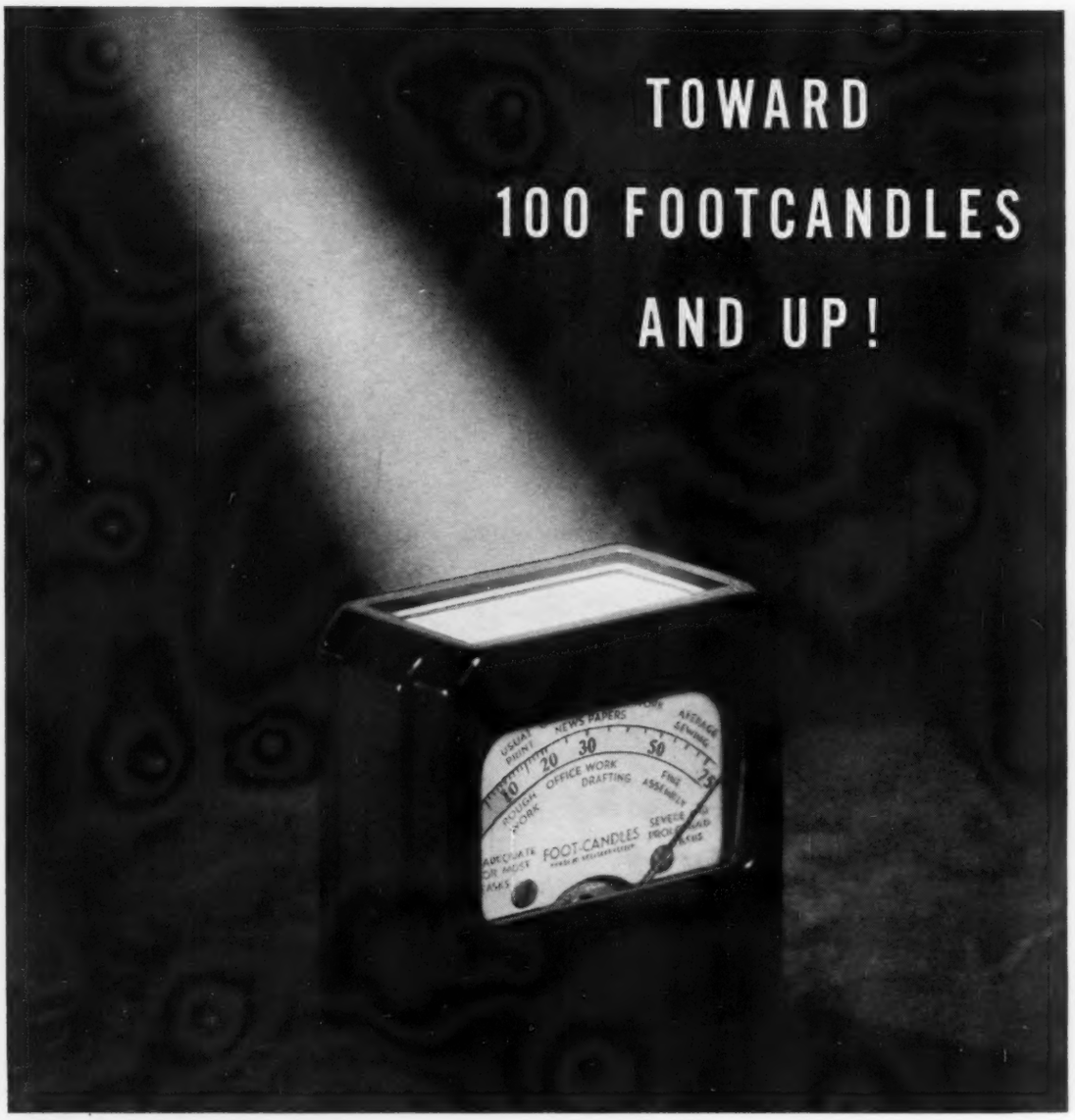
The task of suspending the plates has been a problem. Some companies use straps cast into the plate; some use hooks; some use grooved sticks and wedge the plate between the ends of the tank. Generally speaking, space must be left below the plate in the tank for the deposit of impurities of the metals being refined. The plates must be rolled or cast very even in thickness; otherwise some of the plates will finish before others, and the pure copper will be eaten away and redeposited.

The horsepower or ampere efficiency of a series tank is greater than that of a multiple tank, but requires closer attention and more managerial ability. This arrangement, therefore, is seldom used in copper refining.

It is obvious that a single-series tank will have a much higher resistance than a multiple tank; but regardless of which tank is used, internal resistances cannot be cut down below a certain limit. They are an essential cost of the process and a dead overhead loss. So, by use of large cross-sections and good mechanical contacts to cut down the circuit losses one will connect many tank in series to cause the tank resistance to bear a high ratio to circuit resistance. A more economical generator can also be employed, and with a higher voltage the line or busbar losses will be very low. For these reasons, even small electrolytic units are built with many cells in series where it would be mechanically possible to build only one tank.

In the design of processes, a long tank is built with partitions at intervals to make the cells. On this partition is placed a copper rectangular bus upon which the cathode of one cell and the anode of the next cell rest and make the contact. There may be one or more anodes and cathodes per cell, but they rest on the same copper bus. The surface of the electrodes and the copper bus must be kept free from dirt and corrosion. Most processes have the plates side by side. But in the Thum silver refining process, the cathode may be a puddle of mercury on the bottom of the tank. The tank bottom is also used as the cathode in the refining of sodium hydrate.

Materials for insoluble anodes must be chosen first with regard to insolubility, second with regard to their overvoltage. To show that this is not a small item, the Chile Copper Co. tried over 3,600 different compositions for insoluble anodes. For large-scale work, the choice lies between graphite, hard lead and ferrosilicon, alloys, tantiron, duriron, corrosiron or others in this line. If hard lead is used, casting is



Why Fluorescent Lamps offer a new promise of ideal lighting

THE Science of Seeing has demonstrated the desirability of greater quantities of light for better seeing.

Until now, with incandescent lighting alone, high levels of lighting for "daylight" illumination have been difficult to obtain without excessive heat and cost.

The fluorescent lamp in the future should offer a new means of obtaining daylight quality with coolness, softness, and color-value, in amounts of 100 footcandles and up.

In obtaining these levels, it is not a matter of replacing existing footcandle levels with less power . . . nor of obtaining higher footcandle levels with the same power—a situation that existed when the tungsten filament lamp was introduced many years ago. It offered the public a better and more efficient way of lighting.

And so today, in approaching the goal of ideal lighting, both from the standpoints of quality and quantity, fluorescent lighting inevitably means more kilowatt hours because, historically, higher efficiencies have always increased power consumption. For if fluorescent lighting can be used for obtaining general illumination of 100 footcandles or more, as contrasted with the five, ten, and twenty footcandle levels found today, it cannot help but produce greater connected load.

By thinking and talking in terms of "shade of porch" lighting (250 footcandles) both as to quality and quantity, it won't be long before a few concerns will want to have that kind of lighting installed. They will use it over longer hours, and more constantly. And they will be the forerunners of many others.

In most cases, for some time to come, fluorescent lighting will be used as a plus to incandescent lighting, and vice versa.

With the lighting business so far from the saturation point, a proper presentation of fluorescent lighting can benefit everyone in the lighting business . . . the consumer, utility, fixture manufacturer, jobber, retailer, and manufacturer. General Electric Company, Dept. 166-EW-B, Nela Park, Cleveland, Ohio.

GENERAL ELECTRIC

These two simple lighting jobs meant plus business for the contractors who installed them. Rival restaurant and real estate men ordered similar jobs at once. (See story on page 75.)

preferred to rolling, as the cast skin appears to be somewhat more resistant than the rolled. Probably because of the binding material used, there is a great difference in graphite anodes, some being very unsatisfactory and some very good. Magnetite anodes were given an extensive trial by the Chile Copper Co., but were discarded because they were too easily broken while being handled and had a tendency to crack and split.

When used, anodes of low conductivity are cast hollow and then filled with copper to decrease the circuit resistances.

It is advantageous to keep insoluble anodes in motion, since this decreases the polarization and maintains a more constant concentration at the anode surface.

Cathodes or starting sheets are usually made of the metal to be deposited. That for copper refining is a thin, rolled sheet of copper with grooved wooden strips to prevent deposits around the edge and thus make it easy to strip off the thin sheets. For zinc and silver refining, aluminum is preferable.

In plating, the article to be plated is the cathode. Since this is a quality process, all mechanical imperfections should be removed and the article washed with soap or some alkali. Thereafter, the article should not be touched. If the article is kept moving while plating, superior results are obtained. A higher current can also be used.

Cell resistance is composed chiefly of the resistance of the electrolyte. To reduce this, the electrodes are placed as close together as mechanically possible. In almost all processes, the electrolyte is heated to reduce the resistance with zinc deposition and insoluble anodes. The electrolyte must be refrigerated to prevent re-solution losses. There is also a counter voltage generated by the electrolyte and electrodes acting as a battery. Usually there is a gas film on the electrodes which will increase the resistance.

When the selection of a salt for any refining process is made, many things are to be considered. The acid radical must be reasonably cheap; the salt must be soluble; if the impurities are to be taken off, they should be insoluble in the acid used; the tank lining should not be affected by the acid; poisonous fumes should not be given off, and the cathode should not readily dissolve.

In plating, the cost of the salt used is not so vital. But poisonous fumes should always be considered.

In many processes a diaphragm is necessary to retard diffusion when iron is being deposited on the cathode from a ferrous chloride solution which is being oxidized to ferric chloride at the anode, or where an organic addition agent is being used at the cathodes. Diaphragms are also used in most cases where gases are produced from electrolysis.

Tank materials are different: hard or soft lead for copper multiple refining; heavily asphalted wood for lead and zinc; slate for series copper refining; glass for gold and electrochemical industries; porcelain for silver; acid-proofed portland cement or a sand-sulphur mixture for alkaline solutions. If hard lead is used, 10% antimony gives the best results.

Asphalt-lined tanks have their disadvantages in that high temperatures will cause the lining to run. This is reduced some by adding finely powdered silicate. Other materials have the disadvantages of breaking and the expense of building up. However, cement can be used for either acid or alkaline solutions.

The sand and sulphur mixture as introduced by Charles S. Brady is composed of 1 part sulphur to 1.4 parts sand ground fine enough to pass through a 60-mesh screen. This is heated to not over 150 deg. C. and poured into forms.

Copper is refined commercially from a sulphate electrolyte containing about 3% copper and 12% free acid. Theoretically, the power would be cut in two by using cuprous chloride rather than cupric sulphate, but the sulphate is much cheaper for copper plating.

For silver plating and refining an electrolyte of about 5% silver, 0.1% free HNO_3 and a little copper, use 1½ lb. of copper sulphate crystals and ½ lb. of sulphuric acid per gal. of water.

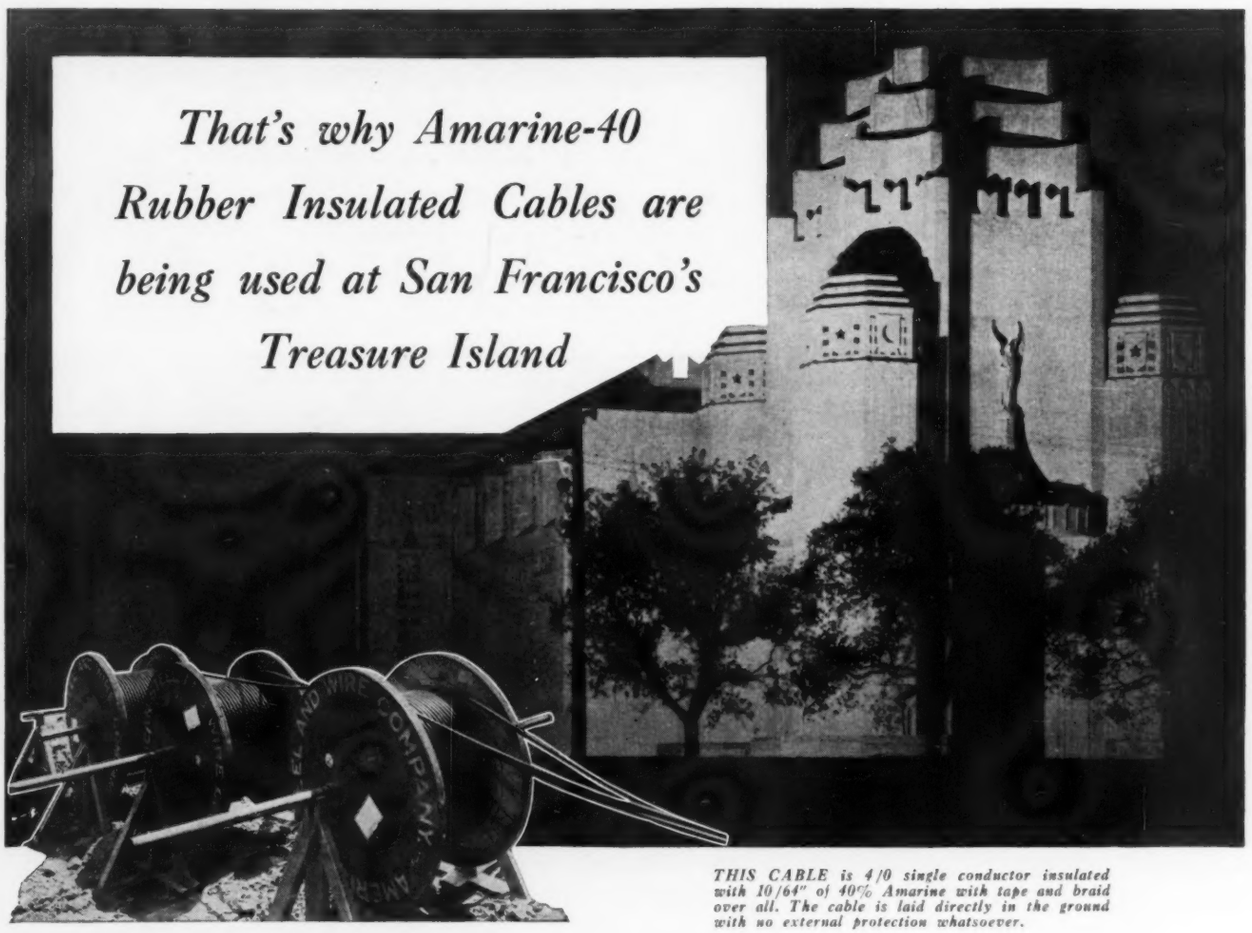
In the Betts process of lead refining the electrolyte contains 8.5% lead, 11.5% hydrofluoric acid, both free and combined, 0.18% hydrofluoric with an additional agent such as glue or gelatin.

Zinc is refined on a large scale from zinc sulphate solutions using insoluble anodes and usually aluminum cathodes. Anodes of prime Western spelter have been largely used by Anaconda Copper Co.

The solutions used must be freed from cadmium, copper, nickel and cobalt by agitation with atomized zinc. The solutions vary from 5 to 7.5% zinc and about 2½% free sulphuric acid, with a current density of 23 to 24 amp. per sq.ft.

Lovely to Look at . . . but

A MIGHTY TOUGH SPOT FOR BURIED CABLES



THIS CABLE is 4/0 single conductor insulated with 10/64" of 40% Amarine with tape and braid over all. The cable is laid directly in the ground with no external protection whatsoever.

TREASURE ISLAND, the site of the GOLDEN GATE International Exposition is "made land." This beautiful spot was literally pumped up from the bottom of the sea. The soil which composes Treasure Island contains quantities of salt and other deleterious substances. Where could one find a spot that offered tougher conditions for cables to resist?

The Engineers of the Golden Gate International Exposition thoroughly investigated rubber insulating compounds for use in their buried feeders which must supply the various buildings and equipment on Treasure Island. The result was that they specified Amarine 40 or its equivalent and purchased a large quantity for this service.

Amarine-40 is an insulating compound designed especially for cables operating under water without protection of lead or other water-proof coverings. Its outstanding characteristics are low water absorption, low specific inductive capacity, good aging qualities and high insulation resistance. Amarine compound is still serving in some of the earliest installations of non-leaded submarine cable. Its excellent properties were the reasons for the Exposition Engineers' decision to use Amarine-40 for this severe service.

COLUMBIA STEEL COMPANY · *San Francisco*

Pacific Coast Distributors of Electrical Wires and Cables for American Steel & Wire Company

United States Steel Products Company, New York
Export Distributors

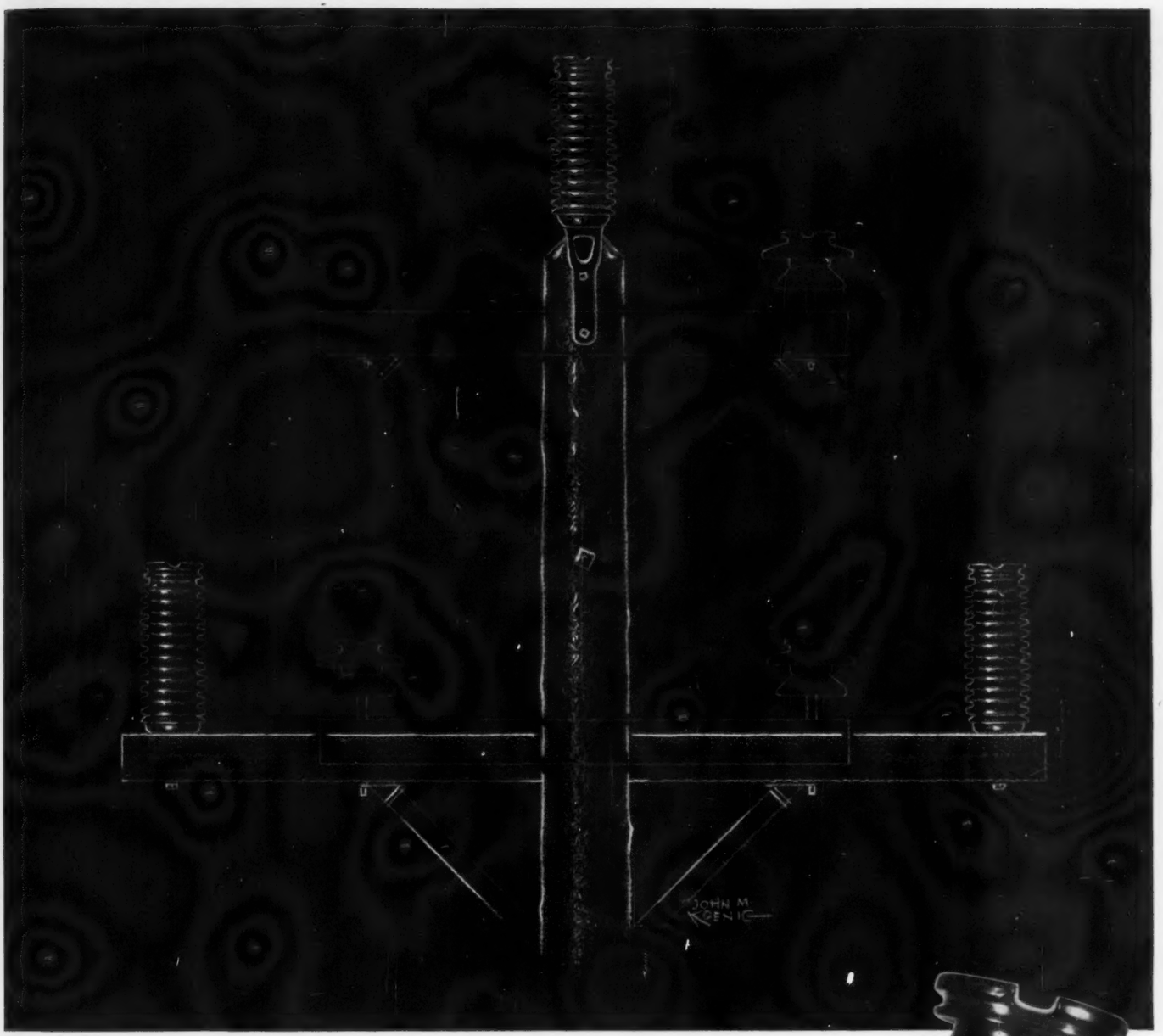
UNITED STATES STEEL

Commercial Lighting

Skylights in Shell Oil's Los Angeles office passed too much heat during summer and made ingenious indirect lighting system inefficient. This system consisted of large discs under which indirect lighting units were suspended (above, left). The discs were low and too bright in contrast with the ceiling: clerks' eyes were strained. Asked what to do about it, Lloyd Gates, Bureau of Power & Light, recommended that skylights be blanked out and entire ceiling painted. This created 20x20-ft. bays. A special Commercial Reflector & Mfg. Co. unit with four Holophane control lenses and opal glass sides and with 150-watt lamps and reflectors behind each lens plate was then placed in each bay against the ceiling. Results (right) were excellent. Light intensity on desks is 35-ft.-candles. Contractor was Bennett & Forsberg

Butte High School's football field is bright with light. On four 2-pole towers, 70 ft. above north side of field, are banks of eight 1,500-watt Crouse Hinds floodlights; on south side are four 50-ft. Union Metal steel poles mounting four 30-in. double reflectors employing 1,500-watt lamps each. Each lamp is individually served. System is controlled by push-buttons in field house. Western Plumbing & Electric Co. installed the job

Best example of electrical modernization that San Luis Obispo, Calif., ever saw was provided by Midland Counties Public Service when it bought an old office building and revamped it from stem to stern (bottom, right). C. J. Kelly, district manager, has an office (left) that is used to show prospects what a fine installation is. It has four 750-watt Curtis units delivering 60 ft.-candles at desk level. Main office and sales display floor (center) are lighted by 28 750-watt indirect units, with bayonet-type bi-post lamps on 12-ft. centers. Windows have 28 200-watt reflectors. After installation was made there were 24 requests for the company's lighting men to recommend new installations for other business establishments in San Luis Obispo. Randolph Electric Co. was contractor



specification for line rebuilding

Thousands of miles of 33 Kv transmission lines now in service are inadequate—force them as you will, and they just can't deliver enough load to satisfy today's increased demands. If you have a 33 Kv line where there should be a 66, let us tell you how easily you can switch over with Line Posts. It's economical because you can use the same poles and conductors—efficient because lines on Line Posts are the most trouble-free lines you ever saw.

LAPP INSULATOR CO. INC

LAPP INSULATORS

LE ROY - N.Y. - U.S.A.

NEWS OF THE INDUSTRY

MUDDLE, MUDDLE, MUDDLE--- THAT'S HETCH HETCHY CASE

More muddled than ever was the City of San Francisco's Hetch Hetchy power case last month. On one hand, city attorneys were awaiting the outcome of an appeal to the U. S. Circuit Court of Appeals. On the other, labor leaders, the city supervisors and the mayor expressed themselves in favor of holding an election to decide whether the city should purchase Pacific Gas and Electric Co.'s distribution system.

Both movements seemed to be gaining strength.

Pending Circuit Court action, Federal Judge Michael J. Roche, who originally ruled that San Francisco was violating the Raker Act in disposing of its Hetch Hetchy power through an agency agreement with P.G.&E., suspended until March 27 an injunction against the disposal.

Meanwhile, labor leaders, apprised of the city's shortage of funds necessary to hold a special election, filed notice of intention to circulate petitions calling for an early vote. Such petitions would require 37,890 signatures plus approval by the board of supervisors.

Exactly what the city would vote on once the required signatures were secured remained something of a question. First plan was to ballot on a charter amendment authorizing issuance of $25,000,000 in revenue bonds to provide partial municipal distribution. Later, following a meeting of the Public Utilities Commission, labor men swung over in favor of the commissions $55,000,000 bond proposal. This would provide for outright purchase of all P.G.&E. distribution facilities within the city as well as additional generating and transmission facilities.

REDUCED ELECTRIC RATES for San Francisco Bay region transportation systems operating on a.c. were put into effect Feb. 1 by Pacific Gas and Electric Co. Chief beneficiary is the Market Street Railway Co. of San Francisco, which will save upwards of $75,000 a year.

THIRTY-FIVE-THOUSAND-DOLLAR annual rate reduction has been announced by Vallejo Electric Light & Power Co. Domestic customers will save 7.8%; commercial customers, 12.7%. Of the total reduction, 53% will be credited to the former.

ANSWER TO SHORTAGE

The Bonneville project is the government's answer to private power shortage and increased demand, Administrator Ross said in his first annual report to Congress last month.

"Bonneville output will stand as a buffer between demand and power shortage," he said, explaining the growth of installed electrical capacity on the Northwest had lagged behind consumption at an alarming rate.

He estimated that by the time the Bonneville project was completed, the Northwest would be ready to consume twice as much power as the project could produce.

NWEL&PA HOLDS DEVELOPMENT MEETING MARCH 16-18

Utility commercial departments and manufacturers and jobbers of electrical appliances in the Northwest will meet with the Business Development Section of the Northwest Electric Light & Power Assn. at the Multnomah Hotel, Portland, March 16-18. Arrangements for the meeting are being completed by a local committee under the direction of George H. Wisting, Northwestern Electric Co.

The conference will be divided between general sessions Thursday morning, Friday afternoon and Saturday morning and committee conferences Thursday afternoon and Friday morning. Among speakers at the general sessions will be Franklin T. Griffith, president of Portland General Electric Co.; LeRoy A. Grettum, manager of Eastern Oregon Light & Power Co.; Adam S. Bennion, assistant to the president of Utah Power & Light Co., and C. A. Eastman, Ebasco Services, New York.

Conferences will be held by the Commercial and Industrial Sales Bureau under C. T. Bakeman, Puget Sound Power & Light Co., chairman; by the home modernization committee, J. F. McAllister, Utah Power & Light, chairman; by the home service committee, Ralph E. Gale, Idaho Power Co., chairman, and by the advertising committee, Gilbert L. Stanton, Idaho Power, chairman. The Rural Sales Bureau, with Earl A. Olson, Idaho Power, chairman, will report on material developed at the Rural Electrification Conference in Portland Jan. 25-27.

BONNEVILLE MAY GET $14,000,000 FOR 1940

If an economy-minded Congress agrees with the budget committee's last-month recommendation, the Bonneville Administration will get $14,000,000 with which to extend transmission lines in 1940.

Regardless of Congress, Bonneville Administrator Ross will push his present construction program. That became obvious when he issued a call for bids on construction of the Bonneville-Vancouver line and announced that Bonneville power will reach Willamette Valley, Ore., communities early next fall.

The proposed $14,000,000 budget provides for high-tension lines throughout Oregon and Washington. Approximately $5,277,000 would finance erection of a series of 110,000-volt circuits to serve Pendleton, Umatilla, Portland and Astoria, Ore.; Pasco, Ellensburg and Yakima, Wash.

A 290-mi. line which would pass through Franklin, Benton and adjacent counties in Washington would interconnect Bonneville and Grand Coulee. The cost of this 220,000-volt circuit, including a major substation, would be $3,310,000.

Public utility districts in Washington would get the major benefit of the $2,471,000 allocated for the building of feeder lines.

Seven million dollars would be used to purchase the fifth and sixth generators and to complete construction of the third and fourth generators in the Bonneville power house. A warehouse adjacent to the Vancouver substation would cost $250,000; administration, operation and maintenance of the Bonneville system would cost $400,000.

Whether Congress grants this much money or not, Administrator Ross will be able to proceed with his plans for some time. When the budget was submitted, he made it plain that he will have $1,500,000 of PWA funds to spend during the next fiscal year.

Proof that he was not worried was his announcement, immediately after federal court gave the Bonneville Administration perpetual use of the right-of-way of the Oregon Electric Railway, that a start would soon be made on construction of the 110,000-volt circuit that will carry power through Clackamas, Marion, Linn and Lane Counties, Ore.

Canby, Ore., which has its own municipal plant, will probably be the

THE BIGGEST NEWS IN PORCELAIN HISTORY!

ENGINEERS AND PURCHASING AGENTS KNOW WHAT THIS DEVELOPMENT MEANS

R-I-P (radio-interference-proof) Porcelain is the Biggest News in the history of Porcelain.

To the engineer, it means that one of his toughest customer relations problem has been licked. R-I-P Porcelain eliminates radio interference at the insulator . . . not by gadgetized afterthoughts, but by an integral part of the insulator itself.

To the purchasing agent, R-I-P Porcelain is just as important because this new development doesn't cost a nickel more than ordinary porcelain. When interference troubles require new porcelain, Westinghouse R-I-P Insulators provide the answer.

Westinghouse Alone Created Permanent Radio-Interference-Proof Insulators

When Westinghouse announced that every Porcelain Insulator, regardless of size, may be radio-interference-proofed, power companies from coast to coast immediately took advantage of this major development—ordering current stocks replaced with R-I-P Porcelain.

This exclusive process is the only permanent method of eliminating radio interference at the insulator because R-I-P is actually part of the insulator. Therefore it will function as long as the insulator itself. There is no need for any Central Station to countenance customer complaint from this source.

At No Extra Cost

You pay no more for these outstanding R-I-P Insulators than for ordinary porcelain. It is the only insulator in the world that is permanently and completely proofed against radio disturbances, without basic changes in design. It contains no corrodible metal of any kind. It has nothing to get out of order. No added cantilever, thermal or torsional stress is thrown on the insulator. Specify Westinghouse R-I-P Insulators in your next porcelain order. Overnight service through a nationwide network of supply depots. Porcelain plants in Emeryville, Cal., and Derry, Pa. Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pennsylvania. J-05040

Westinghouse

W
WESTINGHOUSE ELECTRIC

first customer on this line. It has already applied for a block of power. Monmouth, which voted to go into the power business last November, and Eugene have also applied for power.

Furthermore, petitions are being circulated in Linn and Lane Counties for public power districts. And granges and other organizations in Washington, Yamhill, Polk, Clackamas, Lincoln and Marion Counties are preparing to attempt to push through the legislature an amendment to the public power act which would permit districts to issue revenue bonds to finance distribution.

●

Ross to Start Selling Bonneville Power

Following the Federal Power Commission's approval on Dec. 20 of a temporary wholesale rate schedule for the Bonneville project, Administrator J. D. Ross announced that he would soon begin marketing his available power.

Ross said the temporary schedule will provide an immediate source of revenue, will permit testing of Bonneville generators and will afford a supply of low-cost energy to prospective customers before the "back-bone" transmission lines are completed.

The new schedule, designated as Wholesale Power Rate Schedule E-1, applies to the sale and disposition of temporary power for experimental purposes. According to the commission's order, the rate will be effective between Nov. 1, 1938, and the date of completion of the Bonneville-Vancouver line, but in no event later than Dec. 31, 1939.

The schedule covers sale of primary and secondary power to public bodies, cooperatives and privately owned utilities for resale. For the limited period covered by contracts made under the schedule, purchasers are required to provide adequate facilities for transmission of power.

The rates under E-1 are based on a kilowatt-day rather than a kilowatt-year basis. They are as follows: Prime power—1/365th of $17.50 per day per kw. of billing demand; secondary power—1/365th of $11.50 per day per kw. of billing demand. Power measurements will be at the Bonneville plant busbar, but charges will be made for energy actually received, eliminating transmission losses.

The FPC's approval of the rate permits the extension of Northwestern Electric Co.'s contract covering sale of Bonneville power. According to an order adopted when the contract was signed, the sale of Bonneville power to Northwestern was not to extend beyond Oct. 31, 1938.

Despite his avowed intention to sell power under this temporary schedule, Ross' actions indicated that he was looking much further ahead.

I. B. Adams, P. G. & E. division manager, speaking; PCEA President A. E. Hitchner clapping at the San Jose meeting. R. E. Fisher, P.G.&E. vice-president, is at Adams' right

Late in December he agreed to investigate the value of Pacific Power & Light Co.'s properties in Clark, Skamania, Klickitat, Benton and Franklin Counties, Wash., and report his findings to the public utility district commissioners in those counties. In accepting the job, Ross recommended that the districts acquire the properties as an integrated system or even that they buy the entire system.

"It is poor policy to chop up a utility network," he said. "I believe some plan may be worked out to purchase all of the company's facilities that comprise a single unit."

Adjoining counties in Oregon served by Pacific Power & Light are Hood River, Wasco, Sherman, Gilliam, Morrow, Umatilla and Wallowa. Ross also pointed out that the City of Portland at present has an option to purchase the facilities of Northwestern Electric, an affiliate of the Pacific system.

On other fronts, it was announced that the city council of Cascade Locks, Ore., has authorized the mayor and city council to buy 200 kw. of Bonneville power for the next 20 years. And in Portland, PUD and power company executives of Pacific and Wahkiakum Counties, Wash., arranged tentatively for the acquisition of the properties of West Coast Power Co.

●

NEW POWER PRODUCTION record at Boulder Dam was set in December when 149,770,000 kw.-hr. were produced. This amount was 12% greater than the November figures and 5% greater than December 1937 figures.

●

VOLUNTARY PROPOSAL to make reductions in rates which would save Cheyenne, Wyo., customers an estimated $80,150 annually was made by Cheyenne Light, Fuel & Power Co. to the Wyoming Public Service Commission.

1,000 Inspired by Four PCEA Sessions

Approximately 1,000 electrical men of northern California were inspired by the industry's opportunities and instructed in new business possibilities in a series of four meetings conducted under the direction of the PCEA's industry information committee last month.

In Sacramento 310 attended; in Santa Rosa, 149; in San Jose, 286, and in Santa Cruz, 235. All the meetings were representative of all branches of the industry.

The programs were standard for all sessions. R. E. Fisher, past president of the PCEA and vice-president of P. G. & E., discussed "What Is the Electrical Industry?" George C. Tenney, editor of ELECTRICAL WEST, reviewed market prospects in his talk, "What Does It Mean to Me?" At Sacramento, Dr. Tully Knoles, president of the College of the Pacific, and at the other three meetings, Dr. Paul Cadman, director of the American Bureau of Research and noted economist, gave inspirational addresses on the industry's future. Two meetings were presided over by PCEA President A. E. Hitchner and two by PCEA Vice-President W. W. Glosser.

Additional meetings of a similar nature were scheduled for Santa Barbara on Feb. 3; El Centro, Feb. 9; San Diego, Feb. 10, and Reno, March 10.

●

BECAUSE THE Golden Gate International Exposition will open Feb. 18, the annual meeting of the Pacific Division, NEWA, will be held at Hotel Del Monte, Feb. 15-17. This is the largest of the quarterly meetings held by the wholesalers. This year's program will be augmented by reports from a number of power-company executives on the market outlook for 1939.

●

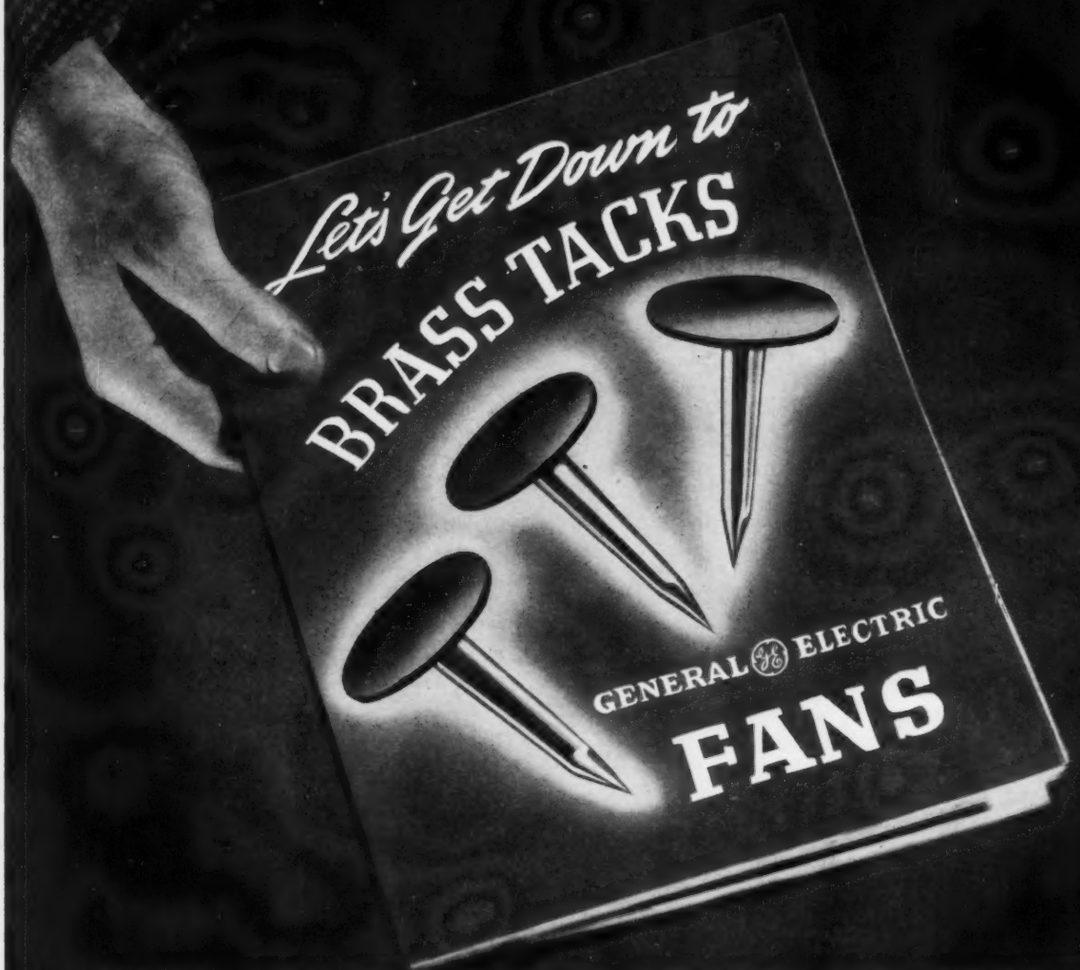
San Joaquin Power Becomes New P. G. & E. Division

Pacific Gas and Electric Co.'s program of integrating its properties and simplifying its corporate structure was completed last month with the transfer to the company of the properties of San Joaquin Light & Power Corp. and Midland Counties Public Service Corp.

Henceforth, these two properties will be operated as the San Joaquin Power Division of P.G.&E.

At a board of directors' meeting to amend the by-laws of the company, the numerical designation of vice-presidents was removed and A. Emory Wishon, president of the San Joaquin company, was elected a corporate vice-president and assistant general manager of P.G.&E.

Take a Look!



HERE ARE THE FACTS ABOUT FAN PROFITS!

Don't commit yourself to any line of fans for 1939 until you have seen the new G-E BRASS TACKS Fan Portfolio! It's crammed with facts about fan profits that make mighty interesting and helpful reading!

The salesman of your local General Electric Fan Distributor will be around shortly to show you his copy of this unique portfolio. Watch for him—listen to him—and profit by his sound advice!

GENERAL ELECTRIC

PRINT IN BINDING

THE METERS OF TODAY

FOR THE LOADS OF TO-MORROW

The value of attractive window displays in the merchandising of load-building appliances is demonstrated by the achievements, in this direction, accomplished by utility companies throughout the country.

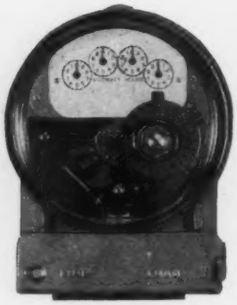
The value of today's meters is demonstrated by their being equal to any measuring or controlling requisite that may arise from present or future load building campaigns.

Thus, the meters manufactured today keep abreast of the times and are truly "The Meters of Today for the Loads of To-morrow".

TYPE HFA

TYPE HFS

TYPE L-2-A



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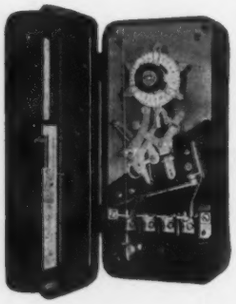


FORM K-11

TYPE HV-11-S-2

TYPE L-2-S

SANGAMO ELECTRIC COMPANY

The co-operative efforts of the Electrical Industry with those engaged in designing and producing watthour meters, have solved — and will continue to solve — the problems of measuring and controlling the wide range of loads of present and future electrical appliances.

SPRINGFIELD · ILLINOIS

Important Events Mark Progress of Western Electrical Industry in 1938

JANUARY

Utah Power & Light reduces rates by $350,000 annually; Central Arizona Light & Power by $200,000 . . . . J. D. Ross appoints Bonneville staff . . . . Z. E. Merrill named president of Mountain States Power.

FEBRUARY

Hurricane lays low power lines in northern California. Service interrupted for hours . . . . Consolidated Builders, Inc., gets $34,442,240 Grand Coulee construction job . . . . FPC allocates 22% of the $53,188,800 spent on Bonneville to power . . . . P. M. Parry, vice-president and commercial manager of Utah Power & Light, dies.

MARCH

Severe storms harass southern California and Utah. Greatest loss—$400,000—reported by Southern California Edison . . . . Hance H. Cleland succeeds the late Chauncey M. Brewer as president of California - Oregon Power Co.

APRIL

PCEA conclave held at Fresno, 300 attending . . . . Federal court rules City of San Francisco's Hetch Hetchy power contract with P.G.&E. violates Raker Act . . . . Public ownership defeated in Oregon; voters in proposed Seven-County Public Utility District ballot 13,537 for district, 21,524 against . . . . Elias Strong, Utah Power & Light salesman, named first manager of Utah Electrical League.

MAY

Northwest Electric Light & Power Assn. and PCEA hold annual conventions . . . . A. E. Hitchener, Los Angeles district manager of Westinghouse, elected to head PCEA . . . . Ross' Bonneville rate schedule submitted to FPC for approval . . . . Hugh M. Crawford, general sales manager of P.G.&E., dies.

JUNE

Pacific Constructors, Inc., awarded $35,939,450 Shasta Dam contract . . . . Colorado - Big Thompson project approved by President Roosevelt . . . . Kilowatt-year rates approved for Bonneville. First transmission line—from dam to Cascade Locks, Ore.—begun. Cascade Locks becomes first city to contract for Bonneville power . . . . Rates reduced by Sierra Pacific Power and Idaho Power . . . . Kinsey M. Robinson, president of Idaho Power. succeeds Frank T. Post as president of Washington Water Power. C. J. Strike, president of Northwestern Public Service Co., succeeds Robinson . . . . W. L. Frost retires from Southern California Edison; John W. Wrenn from P.G.&E.; James A. Cranston from General Electric.

JULY

Los Angeles Bureau of Power & Light announces construction of third Boulder transmission line . . . . Bonneville-Vancouver line work begun. PWA allocates $10,750,000 for Bonneville line construction . . . Work of putting City of Fresno's downtown distribution system underground launched . . . . LeRoy A. Grettum, operating manager of Eastern Oregon Light & Power, chosen president of NWEL&PA . . . . John C. Jones retires from Westinghouse.

AUGUST

Four hundred and fifty attend AIEE meeting in Portland . . . . P.G.&E. seeks consolidation of San Joaquin Light & Power and Midland Counties Public Service Corp . . . . Ogden voters turn thumbs down on municipal power plant . . . . Ross proposes intertying of all federal and municipal power plants . . . . Flathead project named for Frank M. Kerr, president and general manager of Montana Power . . . . O. R. Doerr appointed chairman of the general-office sales committee of P.G.&E.

SEPTEMBER

Work starts on Central Valley project . . . . Eugene allotted $274,833 to build peak-load power plant . . . . RMEL holds record-breaking meeting at Yellowstone . . . . Huge Bonneville contracts awarded. Fight starts on how much City of Cascade Locks should pay for facilities of West Coast Power Co. . . . . John Harisberger, general superintendent of Puget Sound Power & Light, retires.

OCTOBER

Ogden rejects municipal power plant for second time . . . . PCEA holds San Francisco and Hollywood conclaves . . . . Northwestern Section, IAEI, meets in Spokane; Southwestern Section in Long Beach . . . . Ross calls for "ideal" retail rate for Bonneville-power purchasers.

NOVEMBER

Ross announces location of Bonneville lines and substations . . . . Seven of fifteen Northwestern counties vote to form public utility districts . . . . NLRB rules that P.G.&E. discriminated against CIO in collective-bargaining election; also claims that P.G.&E. is engaged in inter-state commerce . . . . First Colorado-Big Thompson construction contract awarded . . . . Apex-Rotarex shuts down Oakland plant.

DECEMBER

Lower Boulder rates provided in agreement reached by seven Colorado River Basin states . . . . Ross revises plans for Bonneville lines and substations because of failure of Washington and Oregon counties to pass on PUD's; proposes industrial chamber of commerce for Northwest power districts . . . . PCEA announces combination of spring conclave and convention . . . . NWEL&PA's fourth annual Commercial Cooking Conference held in Spokane . . . . Western Section, Canadian Electrical Assn., meets in Victoria . . . . Hetch Hetchy injunction postponed . . . . Los Angeles Bureau forsakes its day-labor policy and prepares to call for competitive bids on Boulder line . . . . Franklin T. Griffith named first citizen of Portland for 1938.

WHEN 185 2,500-lumen lamp posts are soon installed, the City of Anaconda will be the first major city in Montana with all its streets lighted from end to end.

●

HEARING on the claimed actual legitimate original cost of Puget Sound Power & Light Co.'s Rock Island Project, on the Columbia River, has been postponed by the Federal Power Commission to March 13. Four 21,000-hp. generating units and a 2,100-hp. station unit are now installed.

CONSTRUCTION of a second 11,000-volt line to Kaneohe, Hawaii, and a new switching station is soon to be started by Hawaiian Electric Co. Provision will be made for installation of an additional circuit and for a change to 44,000 volts at a later date.

●

APPLICATION for a license for a constructed 2,140-hp. power plant on Campbell Creek has been filed with the Federal Power Commission by Swanson Mining Corp., Salyer, Calif. Energy is used for mining purposes.

AMENDMENTS to the city charter of Vancouver, B. C., and changes in the Civic Licenses' bylaw give the city power to raise the $100 ceiling on licenses for public utility companies to $500. Maximum to be paid by any one company and its subsidiaries is $1,500.

●

REA Activities

KOOTENAI RURAL ELECTRIFICATION ASSN., INC., Coeur d'Alene, Ida., has awarded a contract to Homer G. Johnson, Portland, for building 185 mi. of line. $135,525.

An Ounce

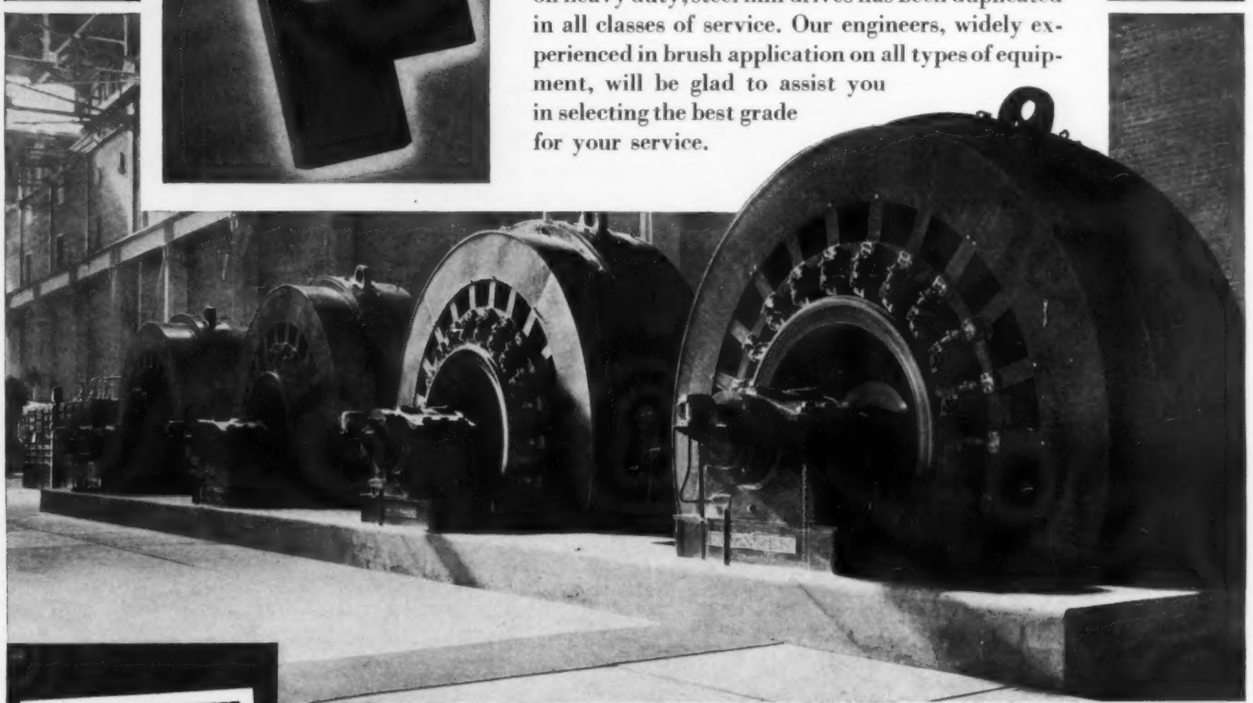
OF PREVENTION IS WORTH A POUND OF CURE

You can cure a commutation failure—at a price—but the cure does not replace the loss incurred when interruption of production results.

Prevent these annoying failures and resulting losses by equipping your entire plant with

NATIONAL
TRADE-MARK
CARBON BRUSHES

The enviable record made by "National" brushes on heavy duty, steel mill drives has been duplicated in all classes of service. Our engineers, widely experienced in brush application on all types of equipment, will be glad to assist you in selecting the best grade for your service.



NATIONAL CARBON COMPANY, INC.

Unit of Union Carbide and Carbon Corporation UCC Carbon Sales Division, Cleveland, Ohio

General Offices: 30 East 42nd St., New York, N.Y. Branch Sales Offices: New York, Pittsburgh, Chicago, San Francisco

Are you getting these bulletins on brushes and commutation? If not, send us your name and address on this coupon.

*Name*_____ *Position*_____

*Company*_____ *Address*_____

*City*_____ *State*_____ EW

SOUTHEAST COLORADO POWER ASSN., has been allotted $55,000 to build 48 mi. of line in Otero County.

NORTHERN IDAHO RURAL ELECTRICAL REHABILITATION ASSN., Sandpoint, Ida., has been allotted $36,000 to build 22 mi. of line in Bonner County.

PUBLIC UTILITY DISTRICT No. 1 of Lewis County, Wash., has been allotted $31,000 to provide generating facilities to supply current for the district's distribution lines.

RIVERTON (WYO.) VALLEY ELECTRIC ASSN., INC., has been allotted $103,000 to build 91 mi. of line in Fremont County.

GARKANE POWER CO., INC., Panguitch, Utah, has been allotted $8,000 to finance house-wiring and plumbing installations.

PACIFIC GAS AND ELECTRIC CO. has agreed to take over the Rural Electric Cooperative, composed of farmers along Stony Creek, Calif., provided the State Railroad Commission approves. As planned, the project entails construction of 126 mi. of line from the present P.G.&E. boundaries west of Willows. It will serve 275 customers and cost about $130,000.

●

Contracts Awarded

TO LOVE ELECTRIC CO. and Graybar Electric Co., Tacoma, for 165 sodium vapor lights to complete the City of Tacoma's lighting system. Total: $12,137.

BY BUREAU OF RECLAMATION for transformers, circuit breakers, disconnecting switches for Green Mountain and East Portal substations, etc., Colorado-Big Thompson Project to Moloney Electric Co., St. Louis, $20,566; to Kelman Electric & Mfg. Co., Los Angeles, $826; to Westinghouse Electric & Mfg. Co., Denver, $5,309; to High Tension Co., Phillipsburg, N. J., $156; to Johnson Mfg. Co., Atlanta, $403; to Bowie Switch Co., San Francisco, $1,047.

TO PELTON WATER WHEEL CO., San Francisco, for waterwheel for hydro plant at Manti, Utah, $5,700; to Westinghouse Electric & Mfg. Co., Salt Lake City, for generator, $5,500; to General Electric Co., Salt Lake City, for switchboard, $5,400.

TO ELLIOTT CO., Kansas City, for turbine for power plant addition, Lamar, Colo., $53,353; to Worthington Pump & Mchy. Co., Kansas City, for condenser, $17,070; to Babcock & Wilcox Co., New York, for boiler, $38,900.

TO O. A. CARLSON, Seattle, for electrical work on social science building at University of Washington, $2,785.

TO KOPPERS CO., Baltimore, for ring seal gates and conduit units for installation at outlet works of Green Mountain Dam, Colorado-Big Thompson project, $54,000.

TO MOORE ELECTRIC CO., Los Angeles, for electrical work on life science buildings for University of California at Los Angeles, $22,826.

TO BALDWIN-SOUTHWARK CORP., Eddystone, Pa., for turbine and governor to be installed in hydro plant at Drop 3 on the All-American Canal, Calif., $132,493. To General Electric Co. on a general contract, $116,152.

TO BROWN JOHNSTON CO., Spokane, for electrical fixtures for state office building at Olympia, Wash., $10,498. To Lighthouse Electric Co., Tacoma, for wiring of building, $40,267.

TO RAFN-MORGAN ELECTRIC CO., Billings, Mont., for electrical work on two schools at Billings, $47,870.

TO WIRE ELECTRIC CO., Tacoma, for wiring of highway department headquarters at Olympia, Wash., $11,189.

TO BETHLEHEM (PA.) STEEL CO. for single-circuit, galvanized-steel transmission-line towers for Los Angeles Bureau of Power & Light's third Boulder circuit, $1,814,493.

TO SPENCER ELECTRIC CO., San Francisco, for high-bay lighting in Palaces No. 14, Extension, and No. 15, Golden Gate International Exposition, plus phone booth outlets, motors, etc., $3,198. To Brumfield Electric Co., San Francisco, for trough-lighting units for Palace of Fine Arts, $19,819.

TO WESTERN PLUMBING & ELECTRIC CO., Dillon, Mont., for electrical work on school addition at Dillon, $10,100.

TO OKANAGAN ELECTRIC and J. M. Edgar Electric, Vernon, B. C., for electrical work on new public building at Armstrong, B. C.

TO BETHLEHEM STEEL CO., San Francisco, for reinforcement steel bars for use in construction of the power house at Shasta Dam, $119,781.

TRADE NOTES

Dealers & Distributors

ASCROFT ELECTRIC MACHINERY CO., LTD., Victoria, B.C., has awarded contract for construction of a new showroom, office and work shop.

●

E. S. HERBERT & SONS, Vancouver, B.C., contractor-dealer establishment, has opened a new retail store at 2532 Main St.

●

MCLENNAN, MCFEELY & PRIOR, LTD., B.C. electrical jobbing establishment, has completed plans for construction of a $50,000 two-story building in New Westminster.

●

NIXON'S, LTD., VICTORIA, B.C., dealer-contractor establishment, won fourth place in Silex Co.'s Canada-wide window display contest.

●

NELSON (B.C) ELECTRIC CO., appliance store, is now occupying its new store at 574 Baker St.

●

EDWARD F. CROSBY has registered his partnership in the business of Crosby Electric Co., Vancouver, B.C.

●

BUCKLES & SMITH is a new San Jose, Calif., wholesaling house handling contractors' supply lines. Owners Robert Buckles and Eugene Smith were formerly connected with Westinghouse Lamp Co.

●

BUTTE (MONT.) STOVE REPAIR has added the Westinghouse line of small appliances and the Speed Queen washer.

●

MONTANA LUMBER & HARDWARE CO., Denton, has added Westinghouse ranges to its line of appliances.

●

FIRESTONE TIRE CO., Butte, Mont., has taken on a full line of small appliances, including General Electric, Westinghouse, Sunbeam and Silex products.

●

MAYTAG ELECTRIC STORE, Glasgow, Mont., has taken on a complete line of IES lamps.

●

E. K. CLOWARD, owner of a general merchandise store at Santaquin, Utah, has opened the first electrical appliance department in the town. He carries Hotpoint and Norge products.

●

SHELLEY (UTAH) HARDWARE CO. has been taken over by John Kirk and is now known as the Kirk Hardware Co. The store has the agency for Norge ranges and refrigerators.

●

DODGE APPLIANCE CO., Salt Lake City, has added a line of Maytag washers and ironers.

●

PALACE DEPARTMENT STORE, Spokane, was first prize winner in the national window display contest conducted by the General Electric home laundry equipment section. Third prize went to Prottas & Levitt, Seattle. Other western winners were Joslin Dry Goods Co., Denver, and Ott Hardware Co., Santa Barbara, Calif.

●

Contractors

S. F. RICKETTS ELECTRIC, LTD., Vancouver, B.C., has completed the wiring installation of a new chapel at a local funeral home.

●

KENDALL RADIO LABORATORIES, LTD., specialists in radio engineering, servicing and contracting, has been incorporated at Victoria, B. C.

●

F. L. DYE CO., Bozeman, Mont., installed the lighting system in a new bowling alley and cocktail lounge.

●

CARLSON APPLIANCE CO., Helena, Mont., has installed a new Frigidaire locker system for freezing and storing meat for Hennessy Bros. The system is said to be the first of its kind in that area.

IT MUST BE RIGHT

smooth sailing with **TRIANGLE**

TRIANGLE PRODUCTS GO PLACES

specify!

TRIANGLE

Double Bushed Armored

CABLE

Hot Dip Galvanized Armor!

Get those words:
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Only TRIANGLE gives you:
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TRIANGLE PRODUCTS REWARD BUYERS!

TRIANGLE CONDUIT & CABLE COMPANY, INC.

Horace Harding and Queens Blvds.
Elmhurst, New York City, N. Y.

Pacific Coast Division: C. C. Hillis, Vice-President in Charge of Sales, 390 Seventh St., San Francisco, California

GOGGANS & PENNIE, Great Falls, Mont., installed new incandescent and Neon lighting in the Ritz Theater.

●

BECAUSE THE CEILING of the Imperial Roller Skating Rink, Portland, was of very wide-meshed lattice-work, the lighting of the floor by indirect fixtures offered a difficult problem. It was solved by Montgomery Electric Co., the contractor on the job, by placing sheets of ply-wood above each of the 300-watt fixtures. Both the ply-wood and the uncovered lattice were then painted white.

●

Manufacturers

AMALGAMATED ELECTRIC CO. has transferred control of the Alberta area from Calgary to Vancouver, B.C. M. Davies will direct the business of the firm in both Alberta and British Columbia from this city.

●

SCHICK SHAVER, LTD., has been incorporated in British Columbia as an extra-provincial company engaged in the distribution, servicing and repair of Schick shavers. Offices are at 719 Dunsmuir St., Vancouver.

●

GRAYBAR ELECTRIC CO. last month held a northern California sales meeting in San Francisco. Leonard Fryer, sales manager at San Francisco, was in charge.

●

Utilities

SOUTHERN CALIFORNIA EDISON CO. has withdrawn all range wiring allowances except for the service entrance unit, which will continue to be supplied free of cost for range installations on Edison lines.

●

HAWAIIAN ELECTRIC CO.'s dealers and salesmen were 1938 winners of Westinghouse's annual Refrigerator Inter-Distributors' Fight Fest. It was their third consecutive victory. The contest is a three-months' battle in which a Westinghouse distributor in one part of the country is pitted against one from another part. Victor is the distributor that sells the highest percentage of quota. Last year the Hawaiian company defeated Westinghouse Electric Supply Co., Butte, Mont., and H. E. Saviers & Son, Reno.

●

CONTINUOUS BILLING has been inaugurated in all towns in Idaho Power Co.'s territory. The system has been used at Boise and Pocatello for several years.

Moved

BONNEVILLE ADMINISTRATION to new building, constructed especially for the project, at 811 Northeast Oregon, Portland. Previously the administration was scattered through several Portland buildings.

SAM PUGH, Chilliwack, B. C., electrical contractor-dealer, to new premises in the Barber block, Westminster Ave.

PAT MFG. CO., Los Angeles, from 1259 to 1334 North Highland Ave.

MAX E. HILL ELECTRICAL MFG. CO. to 2545 Sacramento Blvd., Los Angeles.

ABOUT PEOPLE

Alvord and Moody Named G-E Vice-Presidents

R. M. Alvord and A. S. Moody have been appointed commercial vice-presidents of General Electric Co.

Alvord is manager of G-E's Pacific district, consisting of California, Arizona and western Nevada. A graduate of Iowa State College, he entered the G-E test course at Schenectady and in 1906 was transferred to San Francisco as a salesman. He became manager of the supply department there, then manager of the San Francisco district office and in 1936 manager of the Pacific district.

Moody has been manager of the company's Northwest district since 1936. After graduating from the University of California, he started work in the San Francisco office of the Stanley G. I. Co. In 1907 he joined G-E's San Francisco supply department, a year later transferring to Seattle. Subsequently he was manager of the supply department at Portland, assistant manager of the Portland office and manager of the Los Angeles office. In 1924 he became manager of the Northwestern territory.

●

HARRY FINCH, chief engineer for Grays Harbor Railway & Light Co. since 1924, has been named superintendent of power for Albuquerque Gas & Electric Co. He succeeds the late A. C. Hicks. Curtis Cornwell, assistant chief engineer for the Grays Harbor company, has been promoted to acting chief engineer.

Utah Electrical League Elects Two Vice-Presidents

Two new vice-presidents of the Electrical League of Utah have been elected following amendment of by-laws to provide representation from cities outside Salt Lake. They are Fred Schoss, of Ogden, and B. L. Maycock, of Provo.

Secretaries appointed for the Ogden and Provo branches of the league were A. N. Vendall and D. D. Moffat Jr. respectively.

Named to committee membership were: Finance and membership committee—J. Vernon Sharp, chairman; T. E. Ashworth, W. O. Smith, T. J. Stevens, Maycock and Schoss; activities—W. J. Berryman, chairman; Paul Devine, C. O. Drake, Edward Duggan, Leland B. Flint, Paul W. Huish, Roy Kimberlin, Bob Nevins, Reed R. Smith and W. A. Huckins; publicity and advertising—W. E. Gnadt, chairman; M. L. Cummings Jr., D. D. Moffat Jr., Bert Rowley, M. A. Strand and A. N. Vendall; adequate wiring—L. B. Johnson, chairman; Ora H. Barlow, A. P. Farr, Blaine Grey, M. J. Kynaston, Sam Rosenfield, A. N. Talbot, and C. A. Wolfrom; auditing—S. W. Leaver and Larry Johnson.

●

ARTHUR A. KUHNHAUSEN, formerly in charge of the Philco division of Thompson & Holmes, San Francisco, has been named Landers, Frary & Clark's northern California representative on major appliances.

●

N. H. Callard Transferred By Westinghouse Electric

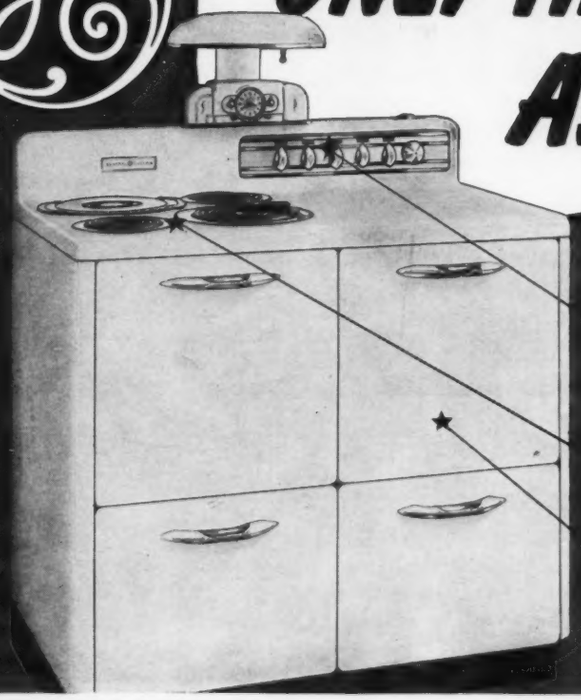
N. H. Callard, for the past 11 years Pacific Coast district manager of the central station department of Westinghouse Electric & Mfg. Co., has been transferred to Pittsburgh as a member of the executive staff of Ralph Kelly, vice-president in charge of sales.

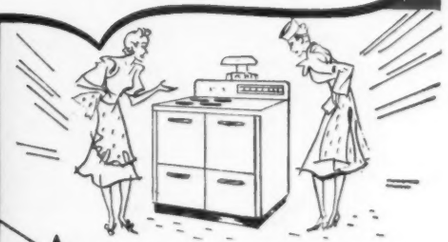
After attending the University of Washington, Callard entered the Westinghouse training course shortly before the war. He resigned to enter service and was captain of infantry. Returning to Westinghouse in 1919, he became a member of the central station sales force in the Salt Lake district. Later he went to New York City, working with A. A. Brown on syndicate sales. Following some special sales assignments, he came back to the Pacific Coast as central station manager for that district.

Callard has been active in various industry organizations, including the PCEA and AIEE.

THE SWING IS TO THE ELECTRIC RANGE

ONLY THE G-E HAS ALL THREE!





1 Tel-A-Cook Lights in Color
Tell at a glance which cooking units are on and the degree of heat being used. Every unit has its own indicating light—every speed its color.

2 Select-A-Heat Calrod Cooking Units
Five cooking heats from one unit, with one switch! A heat for every cooking need—from super-speed to simmer, and 3 heats in between.

3 Nu-Flex Tripl-Oven
3 ovens in one! (1) *Speed Oven* for single shelf cookery. (2) Extra large *Master Oven.* (3) *Super Broiler.* Large capacity for greatest flexibility.

ALL THE ADVANTAGES OF ELECTRIC COOKERY—PLUS!
One-Piece Body, Porcelain Enameled Inside and Out • No-Stain Vent and Oven Moisture Control • *Broiler Meter* • Adjustable Non-Tip Sliding Shelves • Automatic Oven Timer • Built-In Minute Chime • Generous Sized Thrift Cooker.
All or some of these features will be found in each G-E model.

GENERAL ELECTRIC RANGES

A COMPLETE LINE WITH NEW LOW PRICES FOR '39

GO G-E! —ALL THE WAY

A *FULL* line of electrical appliances that win public preference through performance. In practically every wired home in America there is a satisfied user of one or more products bearing the famous G-E monogram!

General Electric Refrigerators, Ranges, Electric Sink (with Dishwasher and Garbage Disposall), Water Heaters, Washers, Ironers —also "Packaged" Commercial Refrigeration Products.

• Take a look at the grandest line of electric ranges General Electric has ever introduced! New exclusive features! New lower prices! Everything you need to do a bang-up sales job—new, forceful sales literature—new Home Demonstration Kit—new, patented Rapid Recipe Rule—new 7-Color Window Displays—new Sound Slide Film—new, beautiful 24-Sheet Posters—new Newspaper Mat Service. • Get all the facts and you'll Go G-E this year! See your G-E Distributor *now.* General Electric Co., Specialty Appliance Div., Nela Park, Cleveland, Ohio.

General Electric Water Heaters
Models for every requirement, including the *new* 2-gallon size for wall installation over sinks in small homes, gasoline service stations, roadside stands, barbecues, etc.

GENERAL ELECTRIC
Electric Ranges and Water Heaters

Southern California Edison commercial department men. Top (left to right): C. E. Houston, R. C. McFadden, R. R. Walbridge, A. W. Althouse. Bottom: C. M. Campbell, W. P. Shaffer, John R. White, C. M. Bliven

Commercial Department Changed by Edison Co.

Number of changes in the personnel of Southern California Edison Co.'s commercial department became effective Jan. 1. They were announced by Fred B. Lewis, vice-president and general manager.

R. C. McFadden, former new business manager, is now sales manager in charge of sales activities. He reports to Commercial Manager C. E. Houston.

R. R. Walbridge is assistant commercial manager. He goes to the company's general offices from Alhambra, where he was division manager for six years.

A. W. Althouse, former Pasadena district manager, succeeds Walbridge at Alhambra. C. M. Campbell, former Alhambra district manager, succeeds Althouse.

W. P. Shaffer, leaving the Covina district where he was manager, is the new district manager at Alhambra. John R. White, manager in the Huntington Park District, is Covina district manager. C. M. Bliven, petroleum engineer, is the Huntington Park district manager.

●

H. S. DeLancie, vice-president of Maydwell & Hartzell, manufacturers' agent, became San Francisco district manager in charge of northern California and Nevada Feb. 1. R. G. Harris became Northwest district manager, with headquarters in Portland, in charge of Oregon, Washington, Idaho and Montana.

G. B. Hulett, Pacific Coast district sales manager for Bendix washers, has been transferred to factory headquarters in South Bend, Ind., where he will have charge of the central region. He will be replaced in the West by R. C. Cameron, who will handle sales in California and Arizona from San Francisco, and by N. W. Laufenswiler, who will cover the Pacific Northwest from Seattle.

●

"Chub" Gerhardt Retires From Crouse Hinds

F. A. "Chub" Gerhardt, Pacific Coast district sales manager of Crouse Hinds Co., has at his own request been relieved of all active responsibilities because of continued ill health. Gerhardt was with the company for the past 23 years, most of that time on the Pacific Coast.

He is succeeded by Horace L. White, formerly Los Angeles sales manager. H. E. Riggs becomes Los Angeles sales manager and George R. Topham takes up similar duties in San Francisco. L. F. Busse continues as Seattle sales manager.

●

L. W. Going, chief electrical inspector of Portland, and L. S. Bush, chief engineer, Board of Fire Underwriters of the Pacific, San Francisco, have been appointed to membership on the Underwriters' Laboratories' Electrical Council. The council, composed of men in active field practice, advises the laboratories on new devices submitted for standards and listing.

Kimball I. Jack Joins Washington Water Power

Kimball I. Jack, assistant advertising manager of Utah Power & Light Co., has joined Washington Water Power Co. as advertising and sales promotion manager.

According to Lewis A. Lewis, assistant general manager in charge of sales, Jack fills a newly created position. "He has complete charge of all sales promotion and advertising," Lewis explained, "including the preparation of all promotional material, coordinating the programs of our residential and farm, commercial and industrial sales departments, and serving as the connecting link with our advertising agency."

Other appointments in Washington Water Power's sales expansion program include the following division sales managers: Frank A. Tool, Spokane; J. J. Fox, Palouse; Gordon De Foe, Lewiston; A. G. Mayer, Coeur d'Alene; Fred J. Williams, Big Bend, and E. W. Belknap, Okanogan.

●

George Miles, San Francisco manager of Westinghouse's merchandising division, was last month transferred to Seattle in the same position. He was succeeded by C. W. Kaylor, division manager at Salt Lake, who was in turn succeeded by L. D. Pulsifer, of Portland.

●

Harry Patton has been appointed division sales manager for the Northbay division, Pacific Gas and Electric Co., to succeed Al Walker. Patton has been connected with the division for several years.

●

Development League Elects Graham Holabird President

Graham Holabird, of National Electric Products Co., was last month elected president of the Electrical Development League of Southern California. He succeeded Ross Hartley, of the Electric Corp.

H. D. Conklin, of Edison General Electric Co., was named vice-president; A. A. Schueler, of Square D Co., treasurer.

Board of trustees is composed of: E. L. Williams and Conklin, representing appliance manufacturers and distributors; Herbert L. Evans and Sidney F. Hill, contractors; Schueler and Holabird, manufacturers' agents; Burdett Moody, E. V. Kane, B. F. DeLanty, W. C. McWhinney and Henry C. Rice, utilities; K. S. Long and A. L. Berg, dealers, and Burrell S. Manuel and Harold D. Burns, wholesalers.

"Son, we're fresh out of kid gloves"

"Somebody's been fooling you, fellow. Kid gloves are like left-handed monkey wrenches and sky hooks; you'll find none of them where they're stringing A.C.S.R."

It's no fooling, of course, that every conductor should be handled with reasonable care. Watch how tough the line boss gets if he sees any wire being dragged across sharp rocks or barbed wire. He's not letting careless handling spoil his record for building good lines.

A.C.S.R. is no untried youngster, but a seasoned veteran. It has proved its ability to give dependable, maintenance-free service. A.C.S.R. combines high strength, ample conductivity and resistance to corrosion. Coupled with A.C.S.R. construction standards, the line builder has an unbeatable combination. ALUMINUM COMPANY OF AMERICA, 2132 Gulf Building, Pittsburgh, Pennsylvania.

A·C·S·R

Aluminum Cable Steel Reinforced

FOR RURAL LINES AND POWER TRANSMISSION

F. L. Hockensmith continues as general manager.

Committee appointments are as follows: Finance committee—Joseph H. Pengilly, chairman; R. E. Smith, A. W. Elliott, D. A. Smith. Membership—S. E. Gates, chairman; W. C. Caffray, J. W. Doan, H. L. Harper, C. E. Houston, Carl Sachs, A. L. Stone.

Domestic appliance—W. H. Dudley, chairman; H. S. Stewart, C. H. Kaufman, A. J. Cole, C. H. Dye, T. H. Chamberlin, H. L. Marsh, W. D. Hostetler, C. L. Reddish, Harry Shane, E. N. Frellson, W. H. Vogel, Rice. Commercial cooking and baking—E. A. Alberts, chairman; S. L. Cipperly, Earle Phillips, Irving Sharkey. Industrial power and heating—W. D. Fabling, chairman; E. J. Cipperly, L. T. Britan, C. D. Smith, J. H. Davis, H. W. Howe, C. W. Doane Jr.

Adequate wiring — D. J. Murray, chairman; E. H. Galchutt, M. L. Michel, W. S. Willis, Perry Brown, R. L. Gill, F. K. Sampson, R. H. Cockfield, L. R. Hanlon, W. R. Cameron, William McKenney, R. M. Fry, W. J. Tretheway. Air conditioning—W. W. Pearce, chairman; H. H. Douglas, H. Peacock, H. L. Quinn, F. E. Pernot, E. H. Kendall, H. F. Haldeman, G. E. Hartman, E. F. Keyes, J. F. Park, I. L. deJongh, E. P. Wells, W. E. Cranston Jr.

Commercial and industrial lighting —Alston Rodgers, chairman; F. A. Hansen, U. L. Beh, George Rankin, T. H. Shepherd, Frank van Gilluwe, H. C. Barnard, H. L. White, J. D. Dieffenwierth, L. M. Watson, M. R. Coles, F. T. Anderson, H. J. Mayo.

●

NAMED TO the Modern Kitchen Bureau's list of regional directors for 1939 have been: G. B. Buck, Public Service Co. of Colorado; R. E. Fisher, Pacific Gas and Electric Co.; Lewis A. Lewis, Washington Water Power Co., and A. C. McMicken, Portland General Electric Co.

●

W. J. CRUIKSHANK, storekeeper of Puget Sound & Light's Western division, has been appointed general storekeeper. He succeeds Jack Ruppe, who retired Jan. 1.

●

WILLIAM HOLLY is now in charge of the electrical appliance department of Standard Furniture Co., Great Falls, Mont.

●

DR. H. B. WALKER, chairman of the California CREA, has been awarded the Johne Deere medal for 1939 in recognition of his "distinguished achievement in the application of science and art to the soil."

PCEA Committees Start Work on Convention

With the appointment of committee personnel, plans for the forthcoming PCEA convention at Del Monte May 17-19 are progressing rapidly. President A. E. Hitchner has appointed H. S. Warren, Westinghouse Electric & Mfg. Co., Los Angeles, general convention chairman.

Initial plans call for a general session Wednesday morning to be followed by parallel sessions of the various sections Wednesday afternoon and evening and Thursday morning. There will be general sessions Thursday afternoon and Friday morning, a golf tournament Friday afternoon and the convention banquet that evening.

WARREN

Convention theme will be the future possibilities of Western industrial expansion and its effect on the electrical industry. One of the feature speakers will be George W. Malone, manager of Industrial West, Inc.

Committee personnel follows:

Transportation committee — George A. Campbell, chairman. Ladies' entertainment—R. E. Fisher, chairman; Miles Steele and Art Bohnert. Golf—J. E. Crilly, chairman; Graham Holabird and F. C. McLaughlin.

Banquet—Joe Long, chairman; Si. Larsen, C. W. Goodwin, Jr., and I. W. Borda. Advertising and publicity—F. M. Raymond, chairman, Al C. Joy and W. A. Cyr. Greeting—Roy Phelan, chairman; Berkeley Snow, George A. Lewis, Bert Haugh, Jim Cunningham, C. N. Parker, Frank Angle, Kenneth L. Hampton and P. S. George. Registration—Stanley W. Scarfe, chairman; C. C. Potts, Paul Wilson and Ralph Peterson.

Program manager is P. S. George.

●

T. E. PARKER has been named chief clerk of Pacific Gas and Electric Co.'s Corcoran district. He succeeds Leo Newcomb, who resigned to enter business in Kingsburg.

●

EMERSON THOMAS, formerly with the Maytag Shop, Missoula, Mont., has joined Duval Wallace Co., Great Falls, as salesman.

●

JOHN LONGDEN, formerly service representative for Westinghouse Electric Supply Co., Salt Lake City, has taken up duties as assistant manager of the company's Salt Lake district.

ELECTRICAL MEN who have been named team captains in the drive for $1,000,000 with which to establish a shipyard in Seattle are: B. B. Blake, manager of Westinghouse Electric & Mfg. Co.; H. E. Plank, manager of General Electric Co.; J. I. Colwell, manager of Graybar Electric Co.; Harry G. Anger, Puget Sound Power & Light Co.; William S. Gaunt, business manager of the International Brotherhood of Electrical Workers, and J. F. NePage, NePage McKenny Co.

●

KENNETH HOOD, a member of Northwestern Electric Co.'s sales organization since 1935, has succeeded Cecil A. Root as sales supervisor in the company's Vancouver district. Root, who joined the company in 1934, resigned to accept a position as manager of the electrical appliance department of Reder's drugstore, Vancouver.

●

M. J. MARLOWE, G. A. Stephenson, J. A. Wilkes, J. R. Ransom and R. E. Grapp carried off top honors in Puget Sound Power & Light Co.'s "Big Apple" campaign on ranges, water heaters and refrigerators.

●

BONNEVILLE ADMINISTRATOR J. D. Ross has been reappointed superintendent of Seattle City Light for the next three years. He first became head of the department in 1911. During his absence from Seattle, W. J. McKeen and Glen Smith will continue to carry his duties.

●

GORDON CRAIG, pioneer Vancouver, B.C., radio dealer, has closed out his radio retailing organization to become official chauffeur for the Mayor of Vancouver. Craig established the first exclusive radio retail business in the four Western provinces.

●

Harold J. Hutt to Head Maintenance Engineers

Harold J. Hutt, of the Pacific Coast Borax Co., was last month elected president of the Southern California Electrical Maintenance Engineers' Assn. He succeeds H. S. Warren, of Firestone Tire & Rubber Co., new chairman of the education committee and a member of the executive committee.

Earl O. Miller, RKO Studios, was named vice-president; C. F. Kimball, Ford Motor Co., secretary-treasurer.

Other executive committee members are: W. W. Starkey, Samuel J. Lindsay, C. C. Gifford, chairman of the program committee; Jerry Ellis, chairman of the social committee; R. Glen Woods, chairman of the editorial committee, and Thomas Hughes, chairman of the membership committee.

out to the last dead end

Line Material Company makes 3,347 different items used for pole line construction. Every clamp, clevis and pin, every item in this complete L-M line has a reputation for doing its part to keep a pole line ship shape. That is, we believe, the reason why on an ever increasing number of power and distribution lines the world over, L-M Pole Line Construction Materials carry the load "out to the last dead end."

LINE MATERIAL CO.

Appliance Society Names R. E. Fisher Secretary

R. E. Fisher, vice-president in charge of public relations and sales of Pacific Gas and Electric Co., has been elected secretary to the board of directors of the Electric Appliance Society of Northern California. He succeeds the late Hugh M. Crawford.

Bert Reynolds, promotional director of the society, has been named domestic sales promotion manager of P.G.&E. He is being assisted in his society work by O. E. Rush, formerly P.G.&E. dealer contact representative in San Francisco.

●

EDWIN D. MURRAY, a member of the Federal Power Commission's bureau of engineering, Denver, has joined the engineering staff of Chase Brass & Copper Co., San Francisco.

●

JOE L. MULLENBACH, president of Mullenbach Electrical Mfg. Co., Los Angeles manufacturer of switchboards and panels, turned over his business to his two sons, Charles and Robert, on Jan. 1.

●

F. W. MCNEILL, of Canadian General Electric Co., Vancouver, has been elected to the council of the Association of Professional Engineers of British Columbia.

●

FORREST H. GARRETT, head of Washington Water Power Co.'s traveling auditors, has been put in charge of payroll and social security records. He succeeds the late J. G. Laughlin, and is succeeded by Ralph Morse.

●

Deaths

FRANK FOWDEN, pioneer figure in the electrical wholesaling business in San Francisco 30 years ago, died in Oakland, Jan. 11. Mr. Fowden was head of Brooks-Follis Electric Co. for many years.

●

EDWARD F. REILLY, formerly a partner in the Electric Corp., Los Angeles, died late in December. He had retired from active participation in the company in 1932.

●

ALEXANDER G. MCCANDLESS, 77, member of the lands department of B. C. Electric Railway Co., and a former president of the Vancouver Board of Trade, died in Vancouver.

●

HENRY S. MINOR, superintendent of the Balch plant of San Joaquin Light & Power Corp. for the past ten years, died in Fresno Jan. 1. He had been a member of the company since 1916. Prior to taking charge of the Balch plant, he was superintendent of construction.

●

JAMES MCKNIGHT, well known to San Francisco electrical contractors as former business agent of Local No. 6, IBEW, died Jan. 4.

●

Speakers

At Montana Power Co.'s commercial sales conference in Billings, Jan. 23-28—J. M. Welch and Mrs. Mary Lowell Schwin, Edison General Electric; A. F. Douglas, F. S. Lang Mfg. Co.; E. W. Johns, Northwestern Auto Supply Co., Billings; L. I. Taylor, Taylor Refrigeration Co., Billings; F. A. Ripley, store equipment designer; E. J. Riley, Graybar Electric; Loyd Larson, Silvray Lighting; Leon Hampton, Sullivan Valve & Engineering Co.; R. G. Dummel and Paul Davis, Holophane Co.; Joe Hannemann, Walter Potter, Lester B. Johnson and J. L. Lorimer, General Electric; F. L. Garrison, General Electric Supply; A. E. Vieau, Crouse-Hinds Co.; R. C. English, Miller Co.; E. A. Casey and S. J. Rosch, Anaconda Wire & Cable Co.; R. E. Renz, C. S. Dean, R. C. Setterstrom and R. H. Colborn, Westinghouse; W. K. Turner, Curtis Lighting; A. C. Sutter, Benjamin Electric Mfg.; J. C. Ryan, vice-president; R. E. McDonough, commercial sales manager; H. E. Chambliss and R. O. Kerr, Montana Power; H. J. Brackendorf, E. C. Gates, R. H. Jones, R. F. Cooke and William Kennedy.

At the annual meeting of Leo J. Meyberg Co., California and Arizona distributor for RCA, Norge, Bendix and Westinghouse lamps—Al Myers, president; Lee Cox, Norge district representative; E. J. Rising and J. M. Tuttle, RCA; Prof. Arnold Purstein, University of California.

At the Jan. 5 meeting of the Golden Gate Chapter, American Society of Heating & Ventilating Engineers—Walter L. Fleisher, chairman of the society's committee on research: "The tremendous toll which heat and humidity take from American industry may be materially lessened and the basis laid for a rational approach to the problems of correct regulation as a result of tests being conducted by the society."

At a joint meeting of the Southern Section, IES, and the Southern California Fixture Dealers' Assn.—Frank A. Hansen, director of the Western Institute of Light & Vision. After his speech on the activities of the IES' home lighting committee, there was discussion as to ways and means of creating a scheme whereby each of the two organizations would coordinate their efforts toward the definite goal of better home lighting.

At meetings of the San Francisco Electrical Development League—Harold Towlson, General Electric: "Station W6XBE (first commercial shortwave station in the West)"; Ken W. Keene, Underwriters' Laboratories: "Approved by the Underwriters."

At a meeting of Edison G-E Appliance Co.'s field organization and distributing agencies in Salt Lake City—B. E. Rowley, Salt Lake district manager; E. W. Turnbull, vice-president and sales manager; M. H. Beekman, manager of the kitchen sanitation division; A. H. Jaeger, manager of the water heater division; D. C. Marble, manager of the range division; G. H. Smith, manager of the refrigeration division; H. E. Warren, manager of the home laundry division; H. P. Gough, finance representative; W. A. Grove, advertising and sales promotion manager, and Clinton Brown, campaign and sales training manager, all of Chicago. Most of these spoke at other meetings in Los Angeles and Portland.

At the 44th annual sales meeting of General Electric Supply Co.'s Salt Lake Division—Jacob A. Kahn, district manager; Will O. Smith, district salesman.

At the Jan. 18 meeting of the American Society of Mechanical Engineers, Seattle—Prof. A. V. Eastman, University of Washington electrical engineering department: "The Present and Future of Television."

At the Jan. 26 meeting of the Air Conditioning Society of San Francisco—Roy Cowles, assistant electrical engineer, Pacific Gas and Electric Co.: "The Effect of Air Conditioning Motor Load on an Electric Distribution System."

At the Feb. 1 meeting of the Southern California Section, IAEI—Inspectors' problems were discussed by H. H. Edwards, city electrical inspector, Claremont; E. H. Heard, city electrical inspector, San Bernardino; L. O. Trim, city electrical inspector, Burbank; E. E. Malmgreen, city electrical inspector, Alhambra; H. L. Caldwell, Los Angeles Bureau of Light & Power; J. L. Cole, city engineer, Montebello; J. W. Robinson, Board of Fire Underwriters of the Pacific, Los Angeles; H. V. Dobson, city electrical inspector, Santa Barbara, and O'Neil Barnwell, superintendent of buildings, Beverly Hills. A. J. Boles, electrical inspector, El Centro, and W. H. Axemaker, electrical inspector, Brawley, participated in organization of the Imperial Valley Chapter.

Moccasin Creek... A Notable Example of Modern Hydro Plant Rehabilitation

FOUR PELTON impulse turbines of 25,000 Hp. capacity were installed for the City of San Francisco in its Moccasin Creek plant during 1925, the units remaining in continuous operation for twelve years. After this service, and in conformity with good maintenance practice, consideration was given to replacement of parts subject to wear, new buckets and nozzles being installed in 1937. Improved hydraulic efficiency in these replacement parts, coupled with a slight increase in effective head, raised the plant output more than 12% above the original capacity.

Hydraulic engineers and utility executives can readily calculate the added income from this Hetch Hetchy development which was obtained at relatively small expense. Many more hydro plants are subject to similar improvement in earning capacity by replacement of minor parts with modern Pelton designs, and without increase in water development costs.

THE PELTON WATER WHEEL COMPANY

HYDRAULIC ENGINEERS

120 Broadway
New York

2929 Nineteenth Street
San Francisco

Paschall Station
Philadelphia

EXCLUSIVE WESTERN REPRESENTATIVES for Baldwin-Southwark Corp., De La Vergne Engine Co., Cramp Brass & Iron Foundries Co., Woodward Governor Co., Cone Valve Division, Chapman Valve Mfg. Co. and Carbondale Division, Worthington Pump and Machinery Corp.

PELTON

Index to Advertisers

FEBRUARY, 1939

Allis-Chalmers Mfg. Co. 14, 15
Aluminum Company of America 95

Blackburn Products Corp., Jasper 18
Burndy Engineering Corp. 18

California Oregon Power Co. 66, 67
Chicago Flexible Shaft Co. 18
Copperweld Steel Co. 8
Corning Glass Works 29
Crocker First National Bank 22

Driver-Harris Co. 75

Electrical Testing Labs. 9

Gardner Elec. Mfg. Co. 16
G. C. A. Mfg. Co. 9
General Electric Co. 27, 30, 77, 85, 93

Hazard Ins. Wire Works 23
Honn Co., Geo. E. 9
Hubbard and Company 1

Idaho Power Company 66, 67
Ideal Commutator Dresser Co. 24
Indiana Steel & Wire Co. 16

Jeffries Transformer Co. 22
Johns-Manville Corp. 4, 5

Kearney Corp., James R. 25
Kelvinator Division, Nash-Kelvinator Corp. 20, 21
Klein & Sons, Mathias 12

Lapp Insulator Co., Inc. 81
Lincoln Meter Co. 73
Line Material Co. 97

Maydwell & Hartzell, Inc. 22
Montana Power Company, The 66, 67

National Carbon Co., Inc. 89
National Electric Products Corp 3

Okonite Company, The 23

Pacific Coast Elec. Bureau ..... Back Cover
Pacific Electric Mfg. Corp. 17
Pacific Gas and Electric Co. ..... Inside Back Cover
Pelton Water Wheel Co. 99

Reliable Electric Co. 6
Rocky Mountain Elec. League 66, 67
Roller-Smith Company 24

Sangamo Electric Co. 86
Schweitzer & Conrad, Inc. 7
Southern California Edison Co., Ltd. ..... Inside Front Cover
Square D Company 13
Superior Switchboard & Devices Co. 75

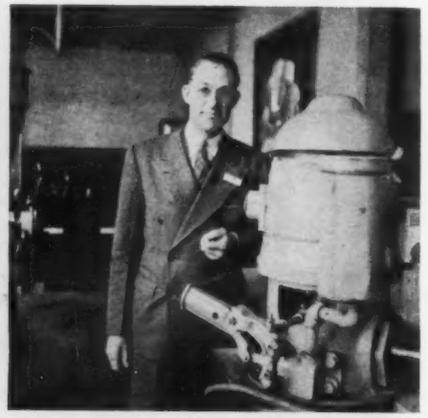
Triangle Conduit & Cable Co., Inc. 91

Union Carbide and Carbon Corp. 89
United States Steel Corp. 79
Utah Power & Light Co. 66, 67

Ward Leonard Electric Co. 9
Washington Water Power Co. 66, 67
Westinghouse Elec. & Mfg. Co. 10, 11, 74, 83
Weston Elec. Instrument Corp. 26
Wiegand Co., Edwin L. 19

PROFILES OF THE MONTH

John Scott, agricultural engineer of Puget Sound Power & Light Co., has conducted over 400 weekly farm radio programs for his company over Station KOMO. He talks and sings



V. A. Bloxham, agricultural sales specialist of Southern California Edison Co., who with Lyle Smith, of that company, has developed an off-peak steam accumulator for dairy sterilization

F. H. (Jack) Harrigan, Pacific Coast field representative of the Modern Kitchen Bureau, is extending his activities for '39 into Wyoming, Colorado and New Mexico. For the past two years he has worked in the other Western states

After several years on the board of trustees of the Electrical Development League of Southern California, Graham Holabird, of National Electric Products Corp., Los Angeles, was this year elected league president

So successful was the record-breaking pre-Christmas electrical exposition held in Casper, Wyo., last year that Don Germond, secretary of the local electrical league, is already making plans for a similar exposition this year

Al Myers, president of Leo J. Meyberg Co., distributor for RCA, Norge, Bendix and Westinghouse lamps in California and Arizona, speaks at the company's annual meeting in San Francisco. He predicted more record sales in 1939

E. B. Hazie (left), San Diego Auto Electric Co., is awarded the President's cup by Powel Crosley, Jr., president of the Crosley Corp., at the company's recent distributors' convention. Hazie received the award for getting the largest percentage of his quota of Shelvador refrigerator sales last year

Preview of coming campaigns by

P·G·and E·

MARCH

ELECTRIC IRONER CAMPAIGN

This announcement is to give you an early start on one of the best appliance promotions ever devised. The campaign inaugurates a revolutionary change in the merchandising of ironers—**a plan wherein the purchaser is taught to use her ironer—free—in her own home!** P. G. and E. will contribute two big newspaper advertisements, proofs of which should reach you on or about March 1. Watch for these proofs and watch for the Electric Appliance Society's official bulletin giving complete details of the campaign.

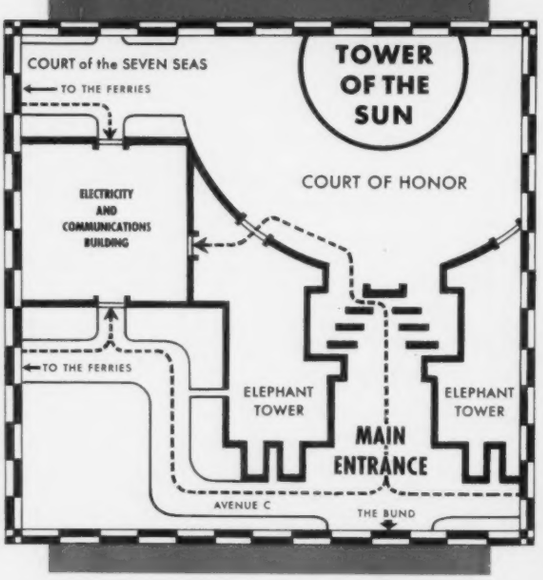
DEALERS: By watching this page from month to month you can keep informed of sales promotional campaigns to be sponsored by the Pacific Gas and Electric Company and the Electric Appliance Society. Detailed information will be supplied, as usual, through the mail. If such information is not received, call our local office or write Electric Appliance Society, 1355 Market St., San Francisco, Calif.

AT EVERY turn, from the spectacular outside lighting to the electric eye that counts the visitors, it is an electrical show.

For years to come the electrical industry in the West will reap the results of interest developed by the lighting and electrical exhibits at this Golden Gate International Exposition.

Run a line on all your advertising and in your correspondence suggesting to your friends and customers that they visit the Electricity and Communications Building. When they return they will be prospects for everything you have to sell from light and adequate wiring to air conditioning and household appliances.

Start at the center of things. Enter through the Portals of the Pacific to the Court of Honor and the Tower of the Sun. Immediately to the left is the Electricity and Communications Building



Pacific Coast Electrical Bureau

447 Sutter St., San Francisco . . . . 601 W. 5th St., Los Angeles